EVALUATION OF EPA NEW ENGLAND'S EMS PILOT EFFORTS FOR K-12 SCHOOLS

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EXECUTIVE SUMMARY

BACKGROUND AND METHODOLOGY

Public schools face considerable challenges in complying with state and Federal environmental requirements, abiding with "best management practice" recommendations, and providing a safe and healthy environment for their students and staff. Resource constraints complicate these tasks and necessitate cost-effective solutions. In support of the Environmental Protection Agency's (EPA's) children's health initiative, EPA New England developed an outreach and assistance program to help schools meet these challenges. As part of this effort, EPA New England launched several environmental management system (EMS) pilots in K-12 schools in 2002 and 2003 to provide financial and technical support for the development of EMSs. EPA's experience with other sectors has shown EMS to be an effective tool for prioritizing and addressing environmental and health issues; maintaining compliance with state and Federal regulations; incorporating pollution prevention into daily operations; and institutionalizing the concept of continuous improvement in environmental performance.

Through pilot EMSs at several schools in Massachusetts and Maine, EPA hopes to identify the benefits, costs, and challenges related to EMS development and implementation. EPA New England entered into the pilot efforts to test the EMS approach in K-12 schools, with the intention to further promote this approach if the pilot results prove positive. The Region's schools sector efforts help schools increase their awareness of environmental responsibilities and encourage schools to adopt a systematic approach to prioritizing and improving environmental conditions in schools through both increased understanding and resource leveraging (governmental, private, and non-profit). The ultimate goal is to create safer, healthier, and more environmentally-sound school environments.

Industrial Economics, Incorporated (IEc) assisted EPA in performing a mid-course evaluation of the K-12 EMS pilots. The evaluation is designed around four key objectives: evaluate the pilot efforts' performance thus far; assess the satisfaction of participating K-12 schools; consider and integrate experience with other school EMS efforts; and identify lessons for promoting future EMS use in the schools sector. The evaluation is based on a series of discussions with participants in and stakeholders to the K-12 EMS pilot efforts, including: five school systems that accessed resources available through an EPA New England EMS grant or cooperative agreement; two school systems that are planning or implementing an EMS independent of the K-12 EMS program; three consultants for schools planning or implementing an EMS; one school that took initial steps towards an EMS but ultimately chose not to implement one; and staff from seven State and Federal Agencies and non-profits who played managerial or advisory roles in the K-12 EMS pilot efforts.

KEY FINDINGS

Discussions with K-12 EMS pilot participants and stakeholders suggest several specific themes:

- ***Motivations for Participating:*** Schools most often signed on to the EMS pilots as part of a broader effort to more effectively manage their environmental responsibilities. Many pilot schools had a specific health/environmental incident that served as the impetus for innovative environmental management efforts; other schools had past health complaints that fell short of being serious "incidents." Schools were largely unfamiliar with the technical specifics of EMS before joining the K-12 EMS pilots; thus, they were not motivated to join by pre-existing EMS expertise. However, several of the schools had experience with EPA's systems-based Tools for Schools program; hence, familiarity with innovative environmental management appears to encourage EMS application.

- ***EMS Champions:*** All participating schools have an individual who galvanized the initial efforts toward EMS development and who continues to work to maintain the project's momentum. This person can be a consultant, a superintendent, or a facilities manager. What is critical is that this individual has credibility among the ground-level EMS implementers (i.e., teachers and maintenance staff) and the ability to motivate staff to move beyond their normal job descriptions to make the EMS work.

- ***Consultant Role:*** Consultants were involved with each of the EMS pilot efforts. There was general consensus across stakeholder groups that consultants played an important role in EMS development. However, respondents emphasized the importance of schools maintaining "ownership" of the EMS. Preferably, consultants play a primary role in developing the EMS conceptual model and gradually shift to a technical support role during EMS implementation. The objective of the pilots and other support efforts is to facilitate future EMS development without future need for consultant assistance.

- ***Priority Environmental Issues:*** Several of the K-12 EMS participants have implemented formal prioritization efforts, identifying functional areas and using some type of scoring or matrix approach to highlight the most pressing health, safety, and environmental issues to be addressed by the EMS. Other participating schools are in the early planning stages of EMS, and have yet to complete a formal prioritization exercise. However, both the formal and informal prioritization efforts have highlighted several common environmental issues: indoor air quality (e.g., mold); chemical management (e.g., purchasing, handling, storage); solid waste reduction; energy/water conservation; and integrated pest management. Pilot schools often balance the need to address these high-priority issues with the desire to build momentum by focusing on lower priority issues that can be readily addressed (e.g., recycling programs).

- ***EMS Development and Implementation Progress:*** Overall, the level of progress shown across the schools is mixed. EPA and the other organizations managing the pilots (American Lung Association of Maine, Massachusetts Department of Environmental Protection, and City of Newton, MA) have put considerable effort into ensuring that schools make strides

with their EMSs. The evaluation examines individual schools' progress and finds that several (e.g., Newton, South Portland) have completed walkthroughs, implemented prioritization exercises, trained staff, and established roles and responsibilities. However, schools are complex organizations with evolving priorities and unpredictable staff demands. As a result, some participants have withdrawn from the effort (e.g., Farmington, ME); others remain in the formative stages of their efforts (e.g., Wiscasset, ME); still others have recently begun their effort (e.g., Saco, ME).[1]

- ***EMS Outcomes and Benefits:*** In general, participating schools cannot yet quantify the environmental and human health outcomes of their EMSs; schools are presently generating baseline data against which to compare future improvements. In the interim, participants in the early baseline stages are comfortable speaking qualitatively about the benefits they have derived from EMS: improved environmental awareness in community (i.e., children bring green ethic home); increased trust, communication, and collaboration between departments within school and between school and town; and active investigative/communication protocols for potential future environmental crises. These qualitative benefits may partially contribute to future quantifiable benefits (e.g., heightened green ethic within community may improve recycling rates), although the EMS's contribution may be difficult to causally establish. Moreover, many EMS benefits, while critically important, may simply not lend themselves to quantification (e.g., improved local capacity to proactively address environmental concerns).

LESSONS LEARNED

The lessons learned thus far from the pilot efforts can be organized into two categories. First, we examine ways that EPA and other stakeholders can build on the K-12 EMS pilot efforts and promote EMS use in the schools sector. Second, we draw on the pilot experiences to offer guidance to schools considering EMS for the first time.

Lessons for Promoting EMS in the Schools Sector

- ***Publicize Pilot Results:*** Interviewees noted that many schools are interested in EMS, but want to see successful examples before they commit time and resources to developing an EMS. In the near term, simply making this mid-course evaluation available at EPA New England's website may help raise schools' awareness of EPA's EMS efforts. In addition, once the pilot is complete, it may be helpful to develop case studies or conduct a conference to convey the details of each pilot school's EMS experience.

- ***Continue Integrating EMS with Enforcement and Awareness Efforts:*** EPA New England may wish to consider ways to promote EMS use through the enforcement system. One option is to promote EMS through Supplemental Environmental Projects (SEPs), i.e., EMS efforts could be funded through reduced settlement penalties with schools or third-party

[1] It is important to note that these EMS pilots occurred on different timelines. For example, while South Portland's effort began in 2002, Saco's cooperative agreement did not begin until 2003.

violators. Other options would involve flexible compliance arrangements (e.g., extended compliance deadlines) for schools that agree to develop an EMS, or a requirement that schools that are the subject of an enforcement action attend EMS training. In addition, some interviewees noted that the state compliance checklists were instrumental in making them aware of their compliance obligations and in encouraging them to explore EMS; it may be worthwhile to expand the availability and use of these checklists.

- ***Offer More "System-Oriented" Tools:*** Available support tools tend to be media- or problem-specific. For instance, while Tools for Schools is an effective tool for helping schools address indoor air quality concerns, its scope is limited to indoor air quality. Likewise, other materials focus on toxics reduction and waste management. Some interviewees called for more materials that provide a broad-based view of the school environment and the suite of potential health risk sources that may exist. It may also be beneficial to offer more detailed informational materials on-line, with a focus on the practical steps of implementing EMS in schools, since some schools may find it difficult to sacrifice staff time for existing training sessions.

- ***Arrange Networking and Training Sessions:*** Stakeholders should convene networking and training sessions that enhance schools' awareness and understanding of EMS. One option would involve convening participants from the K-12 EMS pilots to conduct a small conference for schools considering EMS. A larger event could incorporate the input of regulators and EMS experts from business and academia.

- ***Offer List of Preferred Consultants:*** The evaluation findings suggest that, until schools become more familiar with EMS, few will pursue and complete EMSs without consultant involvement. The schools, ALA-ME, and other pilot participants may wish to develop a list of preferred EMS consultants. The list could highlight the expertise of each consultant and provide contact information. Coupled with more detailed EMS procedural materials (see above), this list could help interested schools pursue EMS independently.

- ***Offer Grant Funding for Performance Monitoring:*** The systematic approach of EMS creates the opportunity for schools to track results and measure success; EPA should work with schools to facilitate this process. Much of the funding provided through the K-12 EMS pilot was devoted to the earlier stages of EMS development, such as walkthroughs and prioritization exercises. EPA may wish to fund a monitoring and performance measurement exercise at one of the pilot schools to illustrate the demands of this EMS phase and to help highlight the benefits of EMS in schools.

- ***Establish Inter-Agency Coordination:*** School environmental management lies at a crossroads between numerous authorities: environmental, education, occupational safety, health, and agricultural agencies at both the state and Federal level all play a role. To expand school EMS use from the pilot level to a larger scale, the relevant agencies should establish more formal coordination. Coordination will ensure that EMSs help satisfy the interests of each agency; bring the expertise of each agency to bear; and give schools the confidence that they are satisfying multiple regulatory authorities.

Lessons for Schools Considering EMS

- ***Understand Environmental Obligations*:** An EMS positions a school to better meet its environmental obligations, including legal and regulatory requirements. Identifying environmental obligations is a key activity in the planning stages of an EMS and helps to define the scope of the effort. Schools considering EMS should investigate information sources such as the Healthy Schools Environment website, the National Clearinghouse for Educational Facilities, the Tools for Schools website, materials offered by EPA's Office of Children's Health Protection, as well as environmental information available at the state or local level (e.g., Commonwealth of Massachusetts' Healthy Schools website).

- ***Form a Core EMS Team*:** Assigning a diverse team to EMS development ensures that: (1) the proper expertise will be available; (2) various groups within the organization will have a role and feel invested in the EMS; and (3) EMS development will not be halted by the loss of one key individual.

- ***Formulate an Environmental Policy:*** Schools embarking on an EMS project should make an effort to craft an environmental policy statement that lays out health, safety, and environmental objectives for the school. This type of broad policy statement allows participants to step back and determine if the EMS is helping satisfy broad goals and provides continuity to the effort if staff changes occur.

- ***Establish Balanced Role for Outside Experts:*** Interviewees noted the critical role consultants play in the EMS process but also noted that consultants should not be the sole motivator for the effort. While school staff should extract procedural direction, technical guidance, and organizational support from consultants and other experts, they should retain a sense of ownership over the EMS and not feel that ideas are being imposed upon them. This approach will help ensure that school staff can maintain the EMS in the long run. Furthermore, schools should carefully evaluate whether contract support is needed at all; available technical resources may be sufficient for school staff to pursue EMS independently.

- ***Secure Long-Run Funding and Support:*** Some of the schools interviewed expressed concern over how the EMS effort would proceed once initial funding was exhausted. Because school staff have shifting responsibilities and because school budgeting is a complex process, it is important to chart a long-term course for the EMS effort. Organizers should establish multi-year roles for project participants and identify funding needs and sources over the long term. Demonstrating the value of EMS to upper-level budgeting decision-makers (e.g., by highlighting cost savings or reduced safety liabilities) will likely be necessary. Organizers should look beyond school budgets for sources of funding, considering environmental grant programs, in-kind assistance from non-profits, and other sources.

- ***Formulate a Public Involvement Strategy:*** Several of the pilot schools communicate the status of their EMS efforts through websites, newsletters, or other outreach materials. However, the interviews conducted with schools suggest that direct public involvement in the EMS process is limited. Schools undertaking EMS may wish to focus greater attention on

systematically involving the public (e.g., municipal officials, parents, medical experts) in the EMS process.

- ***Define Indicators and Monitor Progress:*** Interviews conducted for this evaluation suggest that schools should develop more explicit plans to monitor the performance of their EMSs, using selected health and/or environmental indicators and other outcome indicators. Thus far, none of the pilot schools has established discrete performance targets (although ALA-ME is considering development of an indicators system that could be applied in the school environment, and an upcoming University of Southern Maine grant proposal seeks to link facilities- and health-related metrics to provide more comprehensive assessments). This kind of monitoring and subsequent adaptive management will help schools achieve continual improvements in environmental quality.

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ACRONYMS

ALA-ME - American Lung Association of Maine

DEP - Department of Environmental Protection

EHS - Environmental Health and Safety

EMS - Environmental Management System

EPA - U.S. Environmental Protection Agency

HVAC - Heating, Ventilation, and Air Conditioning

IAQ - Indoor Air Quality

IEc - Industrial Economics, Incorporated

IPM - Integrated Pest Management

K-12 - Kindergarten through Grade 12

MA - Massachusetts

ME - Maine

NE - New England

NIOSH - National Institute for Occupational Safety and Health

BACKGROUND AND INTRODUCTION CHAPTER 1

In support of the Environmental Protection Agency's (EPA's) children's health initiative, EPA New England developed an outreach and assistance program to address the diverse environmental issues facing K-12 schools. As part of this effort, EPA New England launched a series of Environmental Management System pilots for K-12 schools (K-12 EMS pilot efforts) in 2002 and 2003 to provide financial and technical support for the development of environmental management systems (EMSs) in K-12 schools. EPA's experience with other sectors has shown that well designed and implemented EMSs can be an effective tool for prioritizing and addressing environmental and health issues; maintaining compliance with State and Federal regulations; incorporating pollution prevention into daily operations; and institutionalizing the concept of continuous improvement in environmental performance. Through these pilots, EPA hopes to test the utility of EMSs in several K-12 schools before expanding EMS use more broadly within the sector.[1]

During the past several months, Industrial Economics, Incorporated (IEc) has assisted EPA in evaluating the K-12 EMS pilot efforts. This study supports EPA's efforts to:

- Evaluate the performance of the K-12 EMS pilots thus far;
- Assess the satisfaction of participating K-12 schools;
- Consider and integrate schools' experience with EMS outside of the K-12 pilots; and
- Make recommendations for upcoming phases of the K-12 EMS pilot efforts and for broader sector-based strategies.

The results of the study will help EPA New England assess the successes and shortcomings of the K-12 EMS pilots, and in doing so, may suggest areas for potential refinements. The findings of this report will be shared with state agency contacts and others involved in EMS development in New England schools, with the intent of encouraging further EMS implementation in New England. The report also will be shared nationally within EPA, and externally via posting on the Region's web site (<http://www.epa.gov/region1>). The study's general discussion of the merits of an EMS may benefit entities considering an EMS independent of an EPA initiative.

[1] For readers unfamiliar with environmental management systems, Appendix A briefly examines the steps, content, and benefits associated with EMS.

OVERVIEW OF K-12 EMS PILOT EFFORTS

Public schools face considerable challenges in complying with State and Federal environmental requirements and in providing a safe and healthy environment for their students and staff. Resource constraints complicate these tasks and necessitate cost-effective solutions. EPA New England's K-12 EMS pilot efforts help schools develop and use EMSs as a systematic approach to help meet these challenges and to achieve continuous environmental improvement. Through pilot EMSs at several schools in Massachusetts and Maine, EPA hopes to identify the various benefits, costs, and challenges related to EMS development and implementation. EPA New England is focused on helping schools develop systematic approaches to understanding and meeting regulatory requirements and moving these organizations to continuously improve their management of environmental issues, resulting in safer, healthier, and more environmentally sound school environments. The pilot results may encourage EPA to expand EMS use at New England schools, designing future efforts armed with an improved understanding of the sector's needs.

Exhibit 1-1 summarizes the status of pilots funded through EPA New England.[2] Most of the schools are in the early stages of EMS development and implementation. This limits our ability to draw conclusions on the ultimate impact that school EMSs have on health and environmental quality. However, the diversity of schools' progress provides useful insights into EMS development and the influence of the pilot efforts.

This evaluation also incorporates findings from two additional school districts developing EMSs independent of the K-12 EMS pilot efforts:

- **Quabbin Regional School District (Quabbin, MA):** All the schools within the Quabbin Regional District have used the Massachusetts School Checklist to evaluate their human health and environmental issues. The Superintendent now intends to develop an EMS at each of the district's seven individual schools.

- **Waltham School District (Waltham, MA):** As the result of a Massachusetts Department of Environmental Protection enforcement action, Waltham prepared an EMS manual and training program and implemented an EMS within their district.

In addition to the participating schools, EPA's EMS pilot efforts involve state and local agencies as well as nonprofit organizations. Most notably, the following three organizations administer the grant funding provided by EPA and consequently play an important role in management of the overall pilots:

- The Massachusetts Department of Environmental Protection (MA DEP) identifies school EMS participants, allocates grant funding, organizes EMS training opportunities, provides mentors to participating

[2] Several schools expressed initial interest in the EMS pilot, but have since withdrawn from the pilot efforts. These include Lee (MA), Monterey (MA), Portland (ME), and Farmington (ME).

schools/communities, and ensures that EPA is kept informed of participant progress.

- The American Lung Association of Maine (ALA-ME) organizes the K-12 EMS pilots in Maine, establishing goals, enlisting school participation, providing technical consultants, and reporting progress to EPA.

- The City of Newton, Massachusetts uses direct EPA grant funds to implement EMS in its entire 21-school system.

Other key agencies supporting the pilots include the Maine Departments of Environmental Protection and Education; the Massachusetts Department of Education; and the National Institute for Occupational Safety and Health (NIOSH). Additional state agencies (e.g., labor, health, agriculture) were less directly involved in EMS development, but have participated in some EMS status and brainstorming meetings.

Exhibit 1-1

SCHOOLS PARTICIPATING IN THE K-12 EMS PILOT EFFORTS

State	School	EMS Status
Massachusetts	Amherst Middle School	After receiving EMS training, Amherst established a core team to carry out the EMS, identified a fenceline, and developed initial environmental policies and strategies. Amherst recently received a grant to conduct a chemical clean-out; more activities forthcoming. (Status as of April 2004)
	Lenox Memorial Middle and High School	Participates through a regional grant and has received EMS training. Lenox has established a core team, identified a fenceline, identified performance indicators and criteria, and completed a draft EMS workplan. Some activities underway; more activities forthcoming. (Status as of April 2004)
	Newton Public Schools (total of 21)	All schools have formed team and completed EMS training; EMS efforts are most advanced at top-performing schools and schools with existing health/environmental issues. These schools are baselining and completing healthy schools checklists. (Status as of April 2004)
Maine	South Portland Memorial Middle School	Completed an EMS training session in the spring of 2003, established a project team, completed initial identification of functional areas, performed an EMS walkthrough in September 2003. Memorial's formal prioritization matrix is included as Appendix C. South Portland is awaiting a NIOSH report before moving to full EMS implementation. (Status as of September 2004)
	Wiscasset Middle School	Wiscasset completed an EMS training session in the spring of 2003 and is currently identifying and prioritizing environmental health and safety issues across the school's functional areas. Wiscasset's EMS efforts lost momentum after the departure of a key team member. (Status as of July 2004)
	Fairfield School in Saco	Held organizational meeting; created vision and goals; completed issue prioritization; currently developing performance targets and objectives. (Status as of September 2004)

The K-12 EMS pilot efforts drew funding from EPA (through the Office of Water, Office of Children's Health Protection, and Regional funding through the Pollution Prevention and Indoor Air Quality programs); and the American Lung Association of Maine (through its Safe and Healthy Schools initiative, funded by the Indoor Air Quality program). In Maine, schools received funding and consultant support through ALA-ME. ALA-ME received $20,000 from EPA to help fund Saco's pilot and $30,000 to help fund both South Portland and Wiscasset. In addition to providing funding, the Safe and Healthy Schools initiative also developed a collaborative framework for communication, coordination, assistance, and review from key stakeholders (e.g., State agencies and non-governmental organizations).

Massachusetts schools received assistance through several different avenues. MA DEP offered EMS training to town departments (e.g., public works) within 11 communities through its Municipal Stewardship Grant. In addition, MA DEP (through the EMS in Schools Grant) issued $20,000 of EPA funding to the Amherst Board of Health and the Towns of Lee, Lenox, and Monterey (through the Lenox town manager) to implement EMS at one school each in Amherst and Lenox, respectively. Finally, Newton public schools received a direct grant of $25,000 from EPA to move towards EMS implementation in their entire 21-school system, and to develop expertise in other municipal departments to support schools' efforts.

The logic model in Exhibit 1-2 illustrates the different components of the K-12 EMS pilot efforts, providing a graphical representation of the relationships between inputs, outputs, and intended outcomes across participating schools. Traditionally, logic models are applied to illustrate the objectives, activities, and outcomes of a single *program*. In this case, it is important to note that EPA's K-12 EMS pilot efforts do not represent a program *per se*; EPA New England readily notes that each pilot exists independent of others, and pilots employ varying funding sources and often strive for differing objectives. Exhibit 1-2 reflects common elements across EPA's EMS pilots, but because of the non-programmatic nature of EPA's efforts, each component of the logic model may not apply uniformly at each pilot school.

Key components of the logic model include:

- **Goals** define the overarching aims of the pilot efforts. These set the broad principles that guide the rest of the logic model. Ideally, each component of the K-12 EMS pilots should be made consistent with the Goals.

- **Inputs** represent the resources that go into the K-12 EMS pilot efforts. These include time of those involved as well as money from participating agencies.

- **Activities** are the specific actions taken by EPA New England to generate outputs and to ultimately reach the pilot effort's goals.

- **Partners/Participants** include those entities that collaborate on the K-12 EMS pilots (e.g., participating schools and agencies, administrators, and support personnel).

- **Outputs** are the immediate products that result from the inputs, activities, and partnerships of the K-12 EMS pilot efforts.

- **Short-Term Outcomes** are the changes in school environmental management practices or changes in environmental managers' skills or perspectives that are causally linked to the K-12 EMS pilot efforts.

- **Intermediate Outcomes** differ from short-term outcomes in both the nature of the behavioral changes and the time frame on which they are achieved. Intermediate outcomes are broader in scope and often build upon the progress of short-term outcomes. For instance, while a short-term behavioral outcome might be the implementation of proactive strategies for addressing environmental concerns, an intermediate outcome would be the reduced need for EHS crisis management in schools.

- **Long-Term Health and Environmental Outcomes** are the quantifiable endpoints implied by the pilot efforts' Goals. These are the overarching environmental results that the K-12 EMS pilots will ideally yield.

- **Contextual/External Variables** are factors, not directly controlled by EPA New England, that may affect pilot performance. For example, school budgetary changes may alter schools' ability to effectively coordinate environmental management functions.

The goals, activities, and outcomes in the logic model link directly to the questions and indicators used in this evaluation. This evaluation uses the logic model to structure key findings and interpret the success of EPA's K-12 EMS pilot efforts.

STRUCTURE OF THE REPORT

The remainder of the report is organized as follows:

- **Chapter 2** presents the methodology used in this evaluation, examining the interviewee selection, the interview process, and potential performance indicators.

- **Chapter 3** presents the evaluation findings organized by four main areas: motivation and participation; EMS development; EMS implementation and outcomes; and environmental/health outcomes.

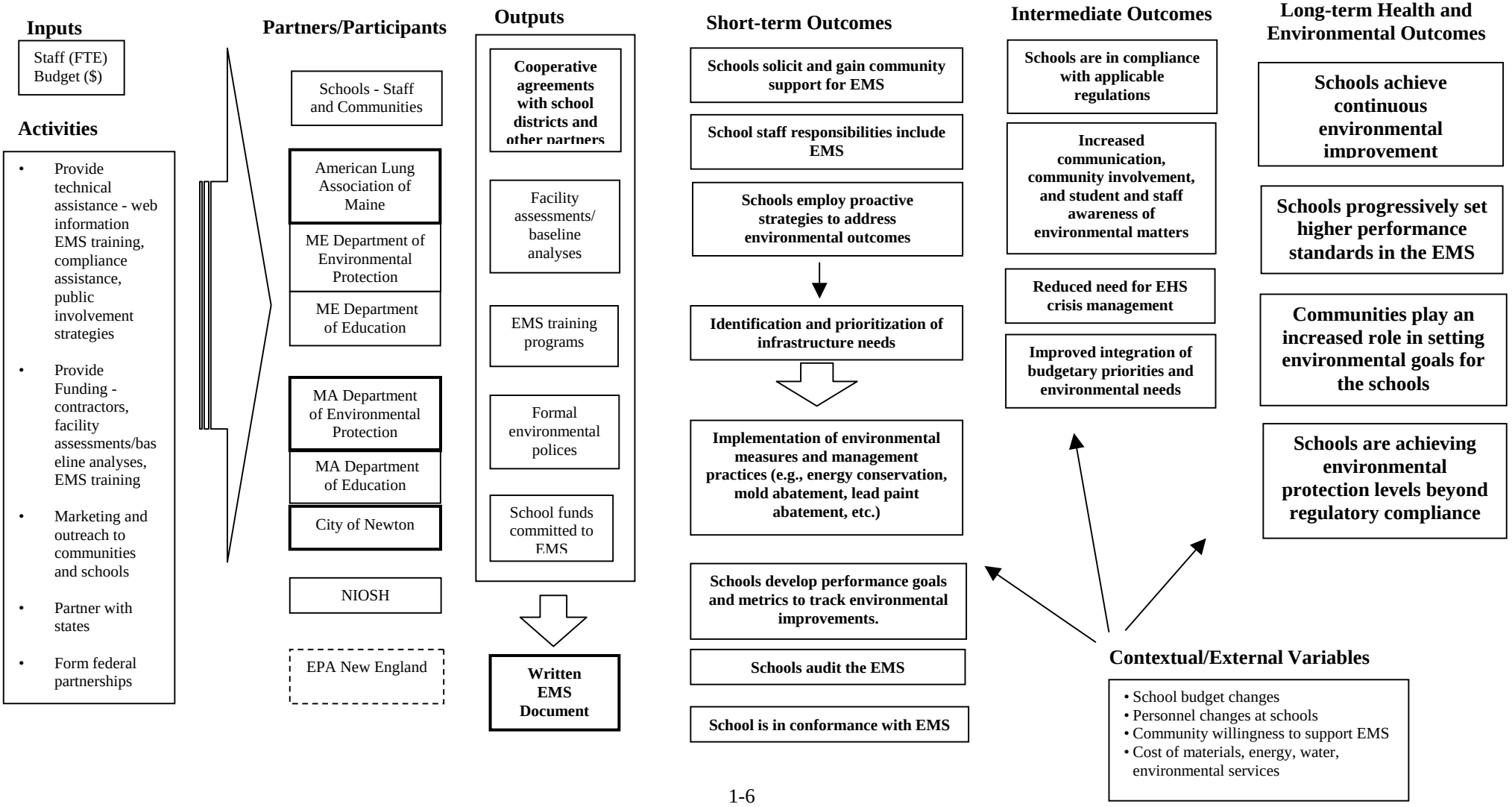
- **Chapter 4** presents our recommendations to EPA regarding management of the K-12 EMS pilots and similar efforts. In addition, we provide lessons learned from pilot schools to help non-pilot schools who are currently developing or considering EMSs.

Appendices A, B, C, D, and E include (respectively) an introduction to EMS concepts; the discussion guides used in this evaluation; two examples of an EMS issue prioritization matrix; and a table describing schools' progress against applicable performance indicators.

EXHIBIT 1-2
LOGIC MODEL FOR EPA NEW ENGLAND'S
K-12 SCHOOLS EMS PILOT PROGRAM WITH SCHOOLS IN MAINE AND MASSACHUSETTS

Goals

To provide financial and technical support for the development of pilot environmental management systems (EMSs) in K-12 schools and determine if EMSs are an effective tool in (1) prioritizing and addressing environmental and health issues; (2) maintaining compliance with State and Federal regulations; (3) incorporating pollution prevention into daily operations; and (4) institutionalizing the concept of continuous improvement in environmental performance.



METHODOLOGY CHAPTER 2

This chapter describes the approach used to evaluate the K-12 EMS pilot efforts. We begin by discussing the interviewees selected and then summarize the process used for the interviews. We then introduce a set of performance indicators around which we organize evaluation findings. Finally, we briefly examine the strengths and weaknesses of the chosen approach.

INTERVIEWEE SELECTION

This evaluation relies primarily upon discussions with participants in and stakeholders to the K-12 EMS pilot efforts. Given the limited availability of written EMS materials, IEc used discussions to gather comparable data across pilot stakeholders. These discussions allow multiple perspectives to shape the conclusions and recommendations of this evaluation. We conducted discussions with five school systems that received technical support for EMS development as part of EPA's EMS pilot efforts; two school systems that are planning or implementing an EMS independent of EPA's K-12 EMS pilots; three consultants for schools planning or implementing an EMS; one school that took initial steps towards an EMS but ultimately chose not to implement one ("non-participant"); and staff from seven State and Federal Agencies and non-profits who played managerial or advisory roles in the K-12 EMS pilots. Exhibit 2-1 summarizes the stakeholders with whom we convened discussions.

INTERVIEW PROCESS

EPA New England furnished background information on the pilots, the status at participating schools, and the training materials used to familiarize schools with the EMS process. IEc used these materials to frame our understanding of the EMS pilots and develop questions for each stakeholder group, building off of a preliminary set of questions provided in the initial work assignment.

Exhibit 2-1

INTERVIEWEES FOR K-12 EMS EVALUATION

Stakeholder Group	Interviewees	State	Interview Date	Phone/In Person
Schools Participating in EPA New England K-12 EMS Pilots	*Amherst Public Schools:* Kelli Kidd, Project Coordinator and Craig Ruberti, Mentor	MA	04/21/04	Phone
	Lenox Schools: Denton Smith, Custodial Services and Jamie Cahillane, Consultant from Center for Ecological Technology (CET)	MA	04/01/04	Phone
	Newton Public Schools: Carol Boch, Project Coordinator; Lynn Rose, Technical Contractor; Carolyn Sarno, Newton Public Buildings Department; and Bob Deluca, Newton Health Department	MA	04/15/04	In Person
	Saco Schools: Elaine Tomaszewski, Superintendent and Maureen McMullen, Principal	ME	03/23/04	Phone
	South Portland Memorial Middle School: Dave Brochu, Facilities Manager and John Obrien, Principal	ME	03/23/04	In Person
Other EMS Schools	*Waltham (MA) Schools*: Susan Parrella, Superintendent and John Pinzone, Fiscal Coordinator	MA	04/14/04	Phone
	Quabbin (MA) Schools: Bob Clark, Environmental Mentor and Chris Nosel, special projects coordinator	MA	03/15/04	Phone
Consultants	*ENSR International*: Susan Pendleton		04/02/04	Phone
	U-Mass Lowell EMS Service Program: Madeline Snow	MA	04/05/04	In Person
	Facilities Consultant: Brant Miller	ME	04/02/04	Phone
Non-Participants	*Portland School District*: Hank Dresch, Facilities Manager	ME	03/04/04	Phone
Federal Agencies, State Agencies, and Non-Profits	*American Lung Association of Maine*: Norm Anderson	ME	03/16/04	In Person
	EPA New England: Anne Leiby, Senior Advisor, A&P2; Joan Jouzaitis, Maine Schools EMS Coordinator; Lee Fiske, Mass. Schools EMS Coordinator; and Jean Holbrook, EPA New England EMS Team	MA/ ME	04/22/04, 04/26/04, 05/07/04	Phone
	Massachusetts Department of Environmental Protection: Eric Fahle, Project Officer on EMS Grant; Sarah Weinstein, Manager on EMS Grant; and Heidi O'Brien, Enforcement Manager	MA	03/24/04	Phone
	Massachusetts Department of Education: Andrea Ranger	MA	03/26/04	Phone
	Maine Department of Environmental Protection: Ann Pistell	ME	03/25/04	Phone
	Maine Department of Education: Jay Readinger	ME	04/27/04	Phone
	National Institute for Occupational Safety and Health (NIOSH): Jean Cox-Ganser		03/22/04	Phone

Note: Wiscasset Middle School (participating school) and Farmington Public Schools (non-participant) declined to participate in this evaluation. The status of Wiscasset's EMS status is discussed briefly in Chapter 3.

The evaluation interviews covered a range of topics, varying by stakeholder group. Discussions with pilot participants, other EMS schools, and consultants to schools focused on the motivation for initiating an EMS; the logistics and challenges of EMS design and implementation; and any observed procedural and environmental outcomes. Discussions with

"non-participants" helped us weigh the perceived value of pilot benefits against the challenges of participation, and gave insight as to the factors that may lead a school to reverse its plans to implement an EMS. With regulators and non-profit staff, we focused on broader topics, such as the overall success of the EMS initiative and the desirability of the EMS approach at schools. To structure our discussions, we utilized discussion guides for each stakeholder group (attached as Appendix B).[3]

IEc conducted in-person discussions with Newton Public Schools; South Portland Memorial Middle School; Madeline Snow of the University of Massachusetts-Lowell EMS Service Program; and Norm Anderson of the American Lung Association of Maine. The remaining interviews were conducted by phone. In cases where we spoke with multiple respondents from the same organization, we conducted group interviews.

PERFORMANCE INDICATORS

At the project's outset, the evaluation team established an initial set of indicators around which to organize the evaluation. Exhibit 2-2 presents the indicators, grouping them according to the components of the logic model. It is important to note that the logic model and associated performance indicators represent the anticipated path of the K-12 EMS pilot efforts. Currently, many of the pilot efforts are at mid-course and thus can only be assessed relative to output indicators (i.e., very few schools cite short-term, intermediate, or long-term outcomes). While most outcome indicators are not applicable at mid-course, we include them in Exhibit 2-2 because they suggest future targets for the EMS pilot efforts.

METHODOLOGICAL CAVEATS

The methodology is subject to several caveats:

- First, the findings of the evaluation are only as accurate as the information provided in the discussions. In some cases, respondents may have misinterpreted questions and reported activities or outcomes performed prior (or unrelated) to EPA's K-12 EMS pilot efforts. In all cases, IEc made an attempt to clarify questions and ground-truth information recorded; however, some inaccuracies may exist.

- Second, various circumstances limited the number and length of the interviews performed. Most notably, two schools (Wiscasset and Farmington, ME) declined to be interviewed for the evaluation because key individuals were not available. Discussions with administrators and facilities staff were held during brief breaks in the interviewees' schedules.

[3] Note that these guides were not used as surveys; therefore, conversations varied among participants.

Exhibit 2-2

PERFORMANCE INDICATORS BY LOGIC MODEL CATEGORIES

Logic Model Category	Indicators
Outputs	• Presence of training programs for environmental management and environmental issues • Number of individuals trained under EMS-related training program • School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours) • Appointment of an EMS Champion, management support for EMS, and increased decisions made by management based upon EMS • Organization of a Core Team • Number/diversity of individuals on Core Team • Completed step of identifying and prioritizing environmental issues through a "facility assessment" (MA) or "baseline analysis" (ME) • Number of functional areas identified in facility assessment • Completed step of assessing legal and regulatory obligations and compliance options • Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress
Short-term Outcomes	• Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)? • Modifications in chemical purchasing practices ♦ Increased quantity of benign/non-toxic chemicals purchased ♦ Reduction in quantity of chemicals purchased/stored on-site • In cases where chemical removal has occurred (or is occurring), quantity of chemicals removed • Development of maintenance protocols (e.g., filter replacement, vent maintenance) to prevent and mitigate mold • Ability of school staff to articulate EMS goals • Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways • Increased awareness of environmental issues among teachers, facilities staff, and administrators • Retrofitting of vehicles to decrease harmful emissions • Development of a plan to minimize idling of diesel buses • Improved management of pesticides and fertilizers ♦ Presence of an Integrated Pest Management (IPM) plan for pesticide application • Presence of a plan to increase solid waste recycling ♦ Expansion of recycling program to include non-conventional items (e.g., computers, hazardous wastes) • Lead paint removal program implemented • Development of energy conservation measures (e.g., motion-sensitive lighting) • Development of water conservation strategies (e.g., low-flush toilets) • Development of options to address air/water radon levels • Identification and management of asbestos insulation • Development of protocols for addressing indoor air quality concerns
Intermediate Outcomes	• Increased communication in the community with respect to environmental concerns (e.g., improved coordination with fire department on safety issues) • Does the EMS include pre-emptive strategies to address environmental concerns before they become crises? • Degree of emissions reduction • Reduction in miles/emissions achieved through streamlining of bus routes • Annual reduction in pesticide/fertilizer use • Fraction of solid waste recycled (realized or targeted) • Quantity of lead paint removed, surface area remediated • Reduction of lead in drinking water • Realized or anticipated energy savings • Realized or anticipated water use reduction • Measured reduction in radon levels • Quantity of asbestos removed • Measurable improvements in indoor air quality • Expressed self-motivation to continue EMS effort in some form • Reduction in environmental violations and/or improved compliance record established through inspections/audits
Note: this mid-term evaluation focuses primarily on short-term and intermediate outcomes. EPA intends for pilot schools to build off these outcomes as part of their efforts to attain the logic model's long-term health and environmental outcomes.	

- Third, many of the evaluation performance indicators are not strict quantitative measures; that is, they require us to make subjective assessments to emphasize critical issues. For instance, to assess increased awareness of environmental issues among staff we listened to how interviewees articulated their experiences in developing the EMS and considered the depth of their responses. As such, much of the evaluation is highly qualitative.

- Finally, pilot schools are in early stages of EMS development and implementation and thus have not progressed to a stage where concrete environmental outcomes have been realized. As a result, the evaluation generally focuses on output-based indicators (e.g., completion of a baseline assessment) rather than outcome/environmental measures.

Overall, this evaluation suggests that pilot schools are making significant progress in planning and implementing EMSs. IEc's discussions revealed that pilot schools are invariably satisfied with EPA's K-12 pilot efforts. In particular, schools emphasized the importance of access to technical experts and grant funding to develop and implement an EMS. All participating schools intend to continue EMS indefinitely (i.e., even without continued grant funding).[4]

The discussion of specific evaluation findings is organized into several categories:

- First, we explore participants' motivations for joining EPA's K-12 EMS pilots and the initial hurdles of participation.
- Second, we assess the EMS development process at participating schools.
- Third, we examine the EMS implementation process and initial EMS outcomes.
- We then discuss the prospect of future environmental and human health outcomes at participating schools.
- Finally, we evaluate overall pilot success by framing the findings in the context of standard EMS elements; evaluation performance indicators; and the pilot efforts' logic model. This section summarizes the progress made by individual school systems involved in the pilots.

[4] As discussed later in chapter 4, EPA may further the pilot efforts' goals by helping schools build capacity to ensure the long-term sustainability of their EMSs.

MOTIVATION AND PARTICIPATION

Schools most often signed on to EPA's K-12 EMS pilots as part of a broader effort to more effectively manage their environmental responsibilities. Exhibit 3-1 summarizes pilot schools' varying motivations for paying closer attention to environmental management.

Exhibit 3-1

SUMMARY OF INCENTIVES FOR EXPLORING EMS AND PARTICIPATING IN K-12 EMS PILOT EFFORTS

- Health incidents/complaints at school
- Town policies and/or environmental ethic
- Desire to consolidate and document environmental goals and protocols
- Provide leverage during school budgeting process
- Acquire grant funds to implement environmental improvements
- Raise student/staff awareness
- Realize operating cost savings
- Improve coordination within schools and with municipalities

Many pilot schools had a specific incident that served as the impetus for innovative environmental management efforts. For example, Saco schools closed a building because of indoor air quality (IAQ) concerns and Waltham schools were targeted for a Massachusetts DEP enforcement action following an oil spill from an underground storage tank. Other pilot schools had past health complaints (often IAQ-related) that fell short of being serious "incidents." Amherst and Lenox took actions consistent with the environmental ethic and priorities within their respective community (e.g., Amherst's town bylaws mandate that facilities use the least toxic chemical possible for a given purpose). In South Portland, administrators at the middle school valued the opportunity to leverage pilot grant funds to make needed health and environmental improvements, and further, to provide legitimacy to those same needs during the school's budgeting process. Several pilot schools (e.g., Lenox and Waltham) sought to realize cost savings through energy and water conservation efforts associated with their schools' EMS. Participants also valued EPA's pilot efforts as an important tool for raising student and staff awareness about environmental issues, and for improving coordination, both interdepartmentally within the school and between the school and the town. Finally, pilot schools used EMS to formally document health and environmental goals and protocols in one place and to take the first step in a more proactive approach to environmental management.

A school that chose not to participate in EPA's K-12 EMS pilot efforts expressed concern about the short-term staff burden associated with initiating and "ramping up" an EMS; a perceived lack of long-term sustainability of EMSs generally; and the possibility that observers may view EMS application as a sign that exceptional health and safety problems exist at the school.

Participating schools generally had experience with innovative environmental management; for example, several schools were familiar with EPA's systems-based Tools for Schools program, which is designed to help schools improve their indoor air quality. However,

they were largely unfamiliar with specific technical aspects of EMS before joining the K-12 EMS pilots.[5] In all cases, third parties were primarily responsible for helping pilot schools identify EPA's pilots as an opportunity to use pre-existing environmental management efforts as a precursor to a formal EMS. For example, MA DEP referred previous grant applicants who could not originally be funded (i.e., through its Municipal Stewardship Grant Program) to EPA's pilot efforts; likewise, ALA-ME sought to partner with Maine schools on EMS efforts (with funding support from EPA). In Newton, a previously-hired private consultant helped convince the school that EPA's pilot was a good fit. Generally, some combination of the superintendent, chief facilities officer, and school principal made the final decision whether or not a school would participate.

Once schools signed on to EPA's pilot effort, they faced the critical task of building support within the school and community for development and implementation of an EMS. Participants emphasized the importance of securing support from teachers and maintenance staff (i.e., the individuals who will implement the EMS on a day-to-day basis), as well as from school administrators. In Amherst, the town's Department of Health built support within the school by framing EMS as a business tool that can save time and money over the long term. In all cases, participating schools have an individual who galvanized the initial efforts toward EMS development and who continues to work to maintain the project's momentum. This person can be a consultant, a superintendent, a facilities manager, or practically any other designation; the critical element is the individual's credibility among the ground-level EMS implementers (i.e., teachers and maintenance staff) and his/her ability to motivate staff to move beyond their normal job descriptions to make the EMS work.

EMS DEVELOPMENT

EMS Development Process

While the nature of pilot schools' EMS development efforts has differed somewhat due to school-specific factors, certain elements are common to all participating schools. First, all participants began their EMS efforts by designating a core team of school staff and administrators to build and manage the EMS. While the team composition varies widely from school-to-school (e.g., only Lenox had students assisting with EMS), teams generally include a mix of the following:

- Superintendent
- Principal
- Facilities/custodial staff
- Consultant/mentor
- Department heads
- Subject teachers
- Project coordinator
- Nurse
- Cafeteria staff
- Town officials (e.g., health, public buildings, public works, fire)
- Union officials (teachers, custodial)

[5] This is consistent with *Environmental Management Systems: Do They Improve Performance?* (University of North Carolina, Chapel Hill, January 2003), which posits that institutions with previous innovative environmental management experience have enhanced potential for successful EMS implementation.

It is worth noting that the "general public" is *not* on this list. With the exception of Saco (which plans to actively involve a local community group), school communities currently have little substantive involvement in EMS development and implementation. Many pilot schools do, however, develop communication strategies to keep the public apprised of progress. For example, South Portland is developing an EMS website to communicate information to parents and the larger community, and has incorporated EMS updates into the school's periodic newsletter. Likewise, Waltham presented its EMS during a televised school committee meeting and Newton publicizes its EMS through local press.

In addition to forming a core team, all participating schools employed the assistance of a consultant to help support their EMS. While pilot schools recognized that a consultant was critical for functions such as EMS organization, development, and implementation, participants did not generally have the expertise necessary to choose a consultant. In addition, no consultants specifically qualify as a "K-12 EMS specialist;" consultants generally had previous EMS and/or engineering experience with related sectors (e.g., colleges), but no direct experience with K-12 schools. These factors placed outside agencies in a position to assist pilot schools in bringing consultants on board. For example, Maine schools work directly with ALA-ME, which provides organizational support and directs the collaborations between pilot schools and a two-consultant team comprising a school facilities specialist and an EMS expert.

There was general consensus across stakeholder groups that consultants play an important role in EMS development. Consultants' most common roles at pilot schools are to:

- Translate complex EMS language into concrete goals/objectives/activities;
- Integrate existing school activities into the EMS framework;
- Maintain momentum by planning/facilitating meetings and brainstorms;
- Assist with school walk-through, baseline checklist, and issue prioritization; and
- Synthesize best practices from EPA/state workshops and training sessions.

Several stakeholders posited that school EMSs could not exist absent consultant support. In the pilots, consultants played a primary role in developing the EMS conceptual model and gradually shifted to a technical support role during EMS implementation. Consultants also add useful structural uniformity to EMSs, which may ultimately facilitate comparisons and performance tallies across pilot schools. However, one of the objectives of the pilot efforts is to establish examples of EMS in school settings, making it easier for schools to develop EMSs without consultant support in the future. The combination of working EMS models, online technical resources, and school-to-school collaboration will help make EMS use more of a self-sustaining practice.

Respondents across states and sectors (e.g., Newton Schools, EPA New England, consultants from Maine and Massachusetts) emphasized the importance of schools maintaining "ownership" of the EMS, despite consultants' critical role. EPA New England felt that the EMS process -- and not necessarily the EMS product -- is most important for building the environmental management capacity necessary for sustainable school EMSs. Consultants in

Massachusetts and Maine agreed: anyone can "fill in the blanks" of an EMS template, but absent engagement and commitment among school staff, the EMS may fail when consultants "hand the reins" to the school. For this reason, EPA New England proposed that school staff on the EMS team should educate themselves while the EMS expert is involved so that they can build the internal capacity necessary to independently implement and maintain their EMS.

Pilot schools generally felt that consultants and other resources provide adequate technical support for school EMS efforts. Schools and consultants frequently cited PEER Center (Public Entity EMS Resource Center; www.peercenter.net), an EPA-supported Internet clearinghouse for EMS information, as a helpful technical support resource. State and local agencies also provided limited technical support. Interviewees felt that EPA New England played a more indirect technical support role, providing critical funding. Acknowledging this indirect role, Newton and Saco schools noted that they were more likely to approach local agencies for advice and support because of existing professional relationships; this suggests that comfort level may be an important factor in schools' willingness to seek technical support. Other pilot schools suggested that EPA's support role -- however indirect -- should include a periodic "check in" to affirm for participating schools that their EMSs are in line with EPA's expectations. Finally, pilot schools felt that EPA could better coordinate its technical support efforts with those of NIOSH and state and local agencies to reduce gaps and "seams" in support materials.

EMS Goals and Activities

Pilot schools varied significantly in terms of their overall EMS goals. Exhibit 3-2 lists the EMS goals at participating schools. Participating schools frequently seek to improve air quality and chemical management. This is consistent with the fact that air quality and/or chemical management concerns (or incidents) were the most common factors driving pilot schools' initial decision to implement EMS.

Not surprisingly, the attainment of EMS goals often requires pilot schools to make modifications to their staffing and operations. While these changes may reduce workload over the long term, they generally add to the short-term responsibilities of administrators (e.g., reporting on progress toward EMS goals), teachers (e.g., implementing chemical waste management practices), and facilities staff (e.g., managing a more rigorous building maintenance program). Specific examples of these changes include:

- **Waltham:** Added compliance officer within facilities dept.; increased facilities budget to cover day-to-day EMS activities.
- **Newton:** Dedicated time of two staff (at 25 percent each); principals and teachers dedicate one to two percent of their time.
- **Quabbin:** Devoted "Special Projects" position primarily to EMS.

Despite these examples, EMSs do not always involve substantial modifications to operations and additions to staff professional responsibilities. At Amherst and Saco schools, for instance, EMS entailed a change in current approaches rather than the development of new approaches. Such

variations in the effort required to implement EMS may be driven by school-specific factors (e.g., degree of pre-existing environmental management capacity).

Exhibit 3-2

OVERALL GOALS FOR K-12 EMS PARTICIPANTS

School	EMS Goals
Amherst	• Develop a chemical management program (i.e., purchasing, handling, storage) • Improve indoor air quality • Educate students and staff on environmental issues • Reduce environmental impacts while saving money • Foster communication between school/town/university
Lenox	• Conserve energy and realize associated cost savings • Expand solid waste recycling
Newton	• Adopt a proactive approach to identify problems and solve them internally • Instill a sense of staff responsibility for health and environmental issues • Institutionalize process for maintaining a healthy school environment
Saco	• Develop formal policy supporting school health and safety • Define roles/responsibilities of school staff and community • Facilitate teacher education on facility operation • Develop communication policies for handing issues/complaints and reporting investigative findings • Identify individuals in community to serve as technical resources
South Portland	• Improve indoor air quality • Develop a chemical management program (i.e., purchasing, handling, storage) • Facilitate teacher education on facility operation • Expand emergency response procedures

EMS IMPLEMENTATION AND OUTCOMES

Prioritizing Issues

In deciding which environmental and human health issues should receive highest priority within their EMS, pilot schools commonly employed some variation of a matrix that breaks out environmental issues by medium or functional area; weights issues according to several criteria (e.g., likelihood and severity of potential health impacts; degree of state/federal regulation); and sums across criteria to arrive at an aggregate rank or score for each issue. Issues with the highest

aggregate rank are given highest priority within the EMS. Appendices C and D provide examples of the prioritization matrices used in South Portland and Saco, respectively.[6]

After working through the prioritization matrix, pilot schools set out to balance the necessity to first address high-priority issues with the desire to build momentum by addressing "low-hanging fruit." For instance, Amherst received grant funding to conduct a chemical clean-out at the school; the administration is using this exercise as an opportunity to build staff capacity before developing and implementing a more comprehensive chemical management plan. In Newton, school administrators ultimately seek to implement EMS in all 21 of the town's schools, bringing EMS first to those schools with the most pressing issues. However, in addition to high-priority schools, Newton administrators have targeted several top-performing (i.e., relatively low-priority) schools for EMS implementation; this serves to build administrative capacity at "warm-up" facilities while preparing school officials for what may be more difficult issues at high-priority schools.

Most participating schools are in the early planning or prioritization stages and have yet to complete a formal prioritization. However, both the formal and informal prioritization efforts have highlighted several common environmental issues:

- Indoor air quality (e.g., mold, radon, asthma);
- Chemical management (e.g., purchasing, handling, storage);
- Solid waste reduction;
- Energy/water conservation; and
- Integrated pest management.

Many of these issues are similar to the extent that they are "global" in nature; that is, they apply facility-wide. School-wide problems may naturally percolate to the top of the priority list. One state agency stakeholder suggested another common theme: high priority issues are often those that "will cause a stir" if revealed to be a health hazard. This finding is consistent with one of the most basic objectives of EMS: to proactively identify potential hazards before they occur and to implement programs to eliminate or control the activities that may cause those hazards.

Short- and Long-Term Environmental Management Actions

EMS is focused on evaluating the priority of environmental issues and establishing procedures and responsibilities for environmental management. As EMS priorities evolve into concrete activities, pilot schools are undertaking the following short-term activities:

- Mold prevention/mitigation actions (South Portland);
- Improvements to chemical storage/handling (Amherst, Lenox, Newton);
- Integrated pest management on school grounds (Newton, Saco);
- Improved maintenance protocols (South Portland);
- Teacher training on facility operation (South Portland);

[6] Newton was the exception: though their system had the same intent and outcomes, it was less formal than the matrices used elsewhere.

- Solid waste recycling (Lenox, Quabbin);
- Energy/water conservation measures (Lenox, Waltham).

Like the EMS priorities driving them, these activities often target school-wide issues. It is also important to note that broader actions -- such as changes in staff professional responsibilities -- may be necessary to lay the groundwork necessary for these activities to succeed.

While EMSs at participating schools generally have not progressed far enough to introduce long-term activities, schools nevertheless have long-term goals in mind:

- Establish formal school environmental policy (all pilot schools);
- Develop pre-emptive strategies to address environmental concerns (Newton, South Portland); and
- Solve conventional issues through non-conventional means (all pilot schools).
- Achieve coordination in community with respect to environmental concerns (South Portland);

The variation among these items -- from environmental policies to community involvement -- shows the broad-based utility of EMS within the K-12 sector. Participating schools intend to use EMS to its fullest extent: as a tool to streamline, inform, and improve many aspects of their operations.

Implementation Challenges

Pilot schools faced several important challenges when developing and implementing their EMS (see Exhibit 3-3). Several respondents (Newton, South Portland, and Lenox) cited time and cost considerations, stressing the numerous responsibilities of administrators, faculty, and facilities staff. For example, Newton schools' special projects coordinator spends 25 percent of her time tending to EMS-related business; this required her to delegate tasks related to other special projects in order to make room in her schedule. Because school days are so busy, South Portland staff dedicate time to the EMS after school and over vacations. In Lenox, cafeteria staff manage the day-to-day activities of the cafeteria waste minimization program in addition to their normal activities.

Exhibit 3-3

COMMON EMS CHALLENGES

Challenge	Description
Time and cost considerations	Increases in staff professional responsibilities; capital improvements to school
Gaining support of upper-level school administrators	Concerns about time/cost considerations; fear of uncovering major problems; inertia (i.e., why fix something that's not broken?)
Building momentum	Hurdle of moving from conceptual EMS model to in-place system; learning curve
Modifying staff behavior	Obstacle of long-standing habits that work against the grain of EMS (e.g., not separating trash)
Keeping EMS simple	Importance of choosing feasible and digestible goals/objectives/activities; EMS structure and documentation should be as intuitive as possible
Making EMS sustainable	Difficulty building capacity and securing funding to allow EMS to continue after EPA pilot ends

Inherent in all the challenges is the need to gain a formal understanding of the EMS process and ensure long-term sustainability. At participating schools, consultants have generally taken on the role of translating formal EMS terms into plain language and distilling schools' broad EMS goals into concrete activities and protocols. If school EMSs are to be sustainable, schools need to build staff capacity in performing these functions previously assumed by consultants.

Environmental and Human Health Outcomes

In general, participating schools cannot yet quantify the environmental and human health outcomes of their EMSs. Pilot schools are presently generating baseline data against which to compare future improvements, partly to justify their EMSs to school boards and taxpayers. South Portland, for example, is developing a tracking system to measure sick days and health complaints as the EMS progresses. Initial data at Lenox indicate waste reductions through its sawdust diversion program (e.g., in wood shop, four cubic yards of sawdust per week given to local farmer for animal bedding) and cloth towel program (e.g., in science rooms, six 800' paper towel rolls per week saved by reusing cloth towels from local resort). ALA-ME is also working to improve baseline and measurement efforts in schools: its work (funded by the State through a CDC tracking grant) in developing Environmental Public Health Tracking Indicators may be readily adaptable to the K-12 schools sector.

In the interim, pilot schools in the early baseline stages are comfortable speaking qualitatively about the benefits they have derived from EMS:

- Quabbin noted improved environmental awareness in the community (i.e., kids bring green ethic home);

- Newton spoke of increased trust, communication, collaboration between departments within school and between school and town; and

- South Portland developed investigative/communication protocols for potential future environmental crises.

These qualitative benefits may partially contribute to future quantifiable benefits (e.g., heightened green ethic within community may improve recycling rates), although the EMS's contribution may be difficult to causally establish. Moreover, many EMS benefits, while critically important, may simply not lend themselves to quantification (e.g., improved local capacity to proactively address environmental concerns).

SUMMARY OF EVALUATION FINDINGS

The progress achieved by the K-12 EMS pilot efforts can be summarized in a variety of ways. Below, we first characterize progress relative to standard elements expected in an EMS and the performance indicators established at the outset of the evaluation. We then consider each pilot individually, characterizing each school's status. Finally, we assess overall progress against the logic model.

Progress Against EMS Elements and Performance Indicators

Schools participating in the K-12 EMS pilots differ significantly in terms of the status of their EMS efforts. Exhibit 3-4 (presented at the end of this section) outlines the current status of EMSs at participating schools that provided input to IEc's evaluation; the status is assessed relative to the 17 primary elements that EPA has designated for EMSs. As shown, all the participants are in relatively early stages of EMS development. Most pilot schools have attained the early elements of EMS (e.g., identifying statutory and regulatory requirements; identifying environmentally significant aspects of school operations; setting EMS goals). Other products and functions such as formal EMS documentation are currently under development. Over the longer-term, some pilot schools intend to attain more advanced EMS elements such as developing formal environmental policies and reviewing their EMSs for efficiency and effectiveness.

Similar conclusions emerge when we assess progress against the series of performance indicators initially proposed to measure the K-12 pilot efforts' progress in this evaluation. Appendix E describes each school's progress against those indicators that apply for the school. It is important to note that many of these indicators are more appropriate for an evaluation of fully-developed EMSs than for an evaluation of pilot efforts at mid-course. Pilot schools' progress to date lies primarily in the early stages of EMS. For example, schools have generally assembled an EMS team and adopted specific goals for their respective EMS; many pilot schools have completed or will soon be completing a baseline assessment of environmental impacts and regulatory requirements; overall environmental awareness has increased in participating schools. However, given that the K-12 EMS pilots are essentially at mid-course, most of the quantitative indicators will be realized over the longer-term. For instance, many participants are actively

implementing efforts (e.g., energy conservation programs) that will likely yield quantifiable results over time. Other long-term indicators (e.g., increased community involvement) are less easily quantified; pilot schools can assess progress against these indicators through more qualitative means (e.g., presence or absence of a coordinated response plan with the local fire department).

Overall, the level of progress shown on EMS development across the pilot schools is mixed. EPA and the other organizations managing the pilots (ALA-ME, Massachusetts DEP, and the City of Newton) have put considerable effort into ensuring that pilot schools develop their respective EMS efforts. However, schools are complex organizations with evolving priorities and unpredictable staff demands. While schools such as South Portland and Newton have progressed well in their EMS process, other pilot schools (e.g., Wiscasset) remain in the formative stages of their efforts (see below).

Summary of Individual School Status

The following paragraphs summarize each pilot school's overall progress as measured against (a) the 17 primary EMS elements (Exhibit 3-4); and (b) the performance indicators outlined in Appendix E:

Newton Public Schools has undertaken a comprehensive and aggressive plan to move toward EMS implementation at each of its 21 schools and has invested resources in training other municipal officials so that they can support the schools in their EMS efforts. The public schools were motivated to form an EMS team by previous school-related health incidents. The team is well balanced and includes school officials, city officials, and a consultant. In addition, each school has a team in place and each team has received training and is implementing more advanced EMS concepts on a school-by-school basis. The town's proactive approach aims to instill in staff a sense of responsibility for their own workspace (e.g., teachers are responsible for their classrooms). While Newton's issue prioritization efforts were less formal than those at other pilot schools (i.e., no quantitative matrix approach), it is unique among the pilot schools in that it has pursued several facets of its EMS simultaneously (e.g., IAQ, chemical management, and IPM rather than one of the three), and has plans to continue and broaden its EMS within schools and, eventually, transfer EMS elements to other municipal departments.

South Portland Memorial Middle School has an established EMS that focuses primarily on indoor air quality. The school was motivated by previous IAQ issues, including complaints that prompted a classroom closure. South Portland's team includes broad representation among school staff, with ALA-ME and a consultant playing organizational and advisory roles. Training programs include practical topics (e.g., classroom ventilation) in addition to EMS concepts. South Portland has concrete plans to implement a performance measurement database to track sick days and health complaints, and the school's proactive community involvement strategy delineates "planned reactions" for future complaints. A formal issue prioritization effort resulted in 23 functional areas for consideration. South Portland's short- and long-term objectives with respect to indoor air quality are the most comprehensive of those at any pilot school; the school also developed objectives to promote EHS-related best

management practices. South Portland intends to continue its EMS indefinitely; the school's comprehensive baselining efforts should help demonstrate success over time.

Lenox Memorial Middle and High School is implementing an EMS that initially takes aim at waste reduction and energy conservation. The strong environmental ethic among town residents was the primary impetus for the school's decision to pursue EMS. Lenox is the only school among EPA's pilots that gives students a role in its EMS; several teachers, a member of the custodial staff, and a consultant round out the core team. The school does not have formal EMS training in place; core team members receive limited *ad hoc* training from the consultant, and several participated in EMS training offered by the Commonwealth through the Municipal Stewardship grant. The superintendent and school principals worked with the core team to prioritize environmental issues and develop EMS objectives. Waste reduction efforts -- serving as "low-hanging fruit" -- have yielded early results in recycling sawdust and reducing paper towel waste. Upcoming energy conservation efforts are expected to further the school's measurable accomplishments. While waste reduction and energy conservation efforts are expected to extend well beyond the pilot period, the school's future efforts in other functional areas (e.g., chemical management) are less defined.

Amherst Middle School has made progress in setting up an EMS with an early focus on chemical management. The town's bylaws were a major factor in the school's choice to implement EMS; for this reason, the town health department plays an important role in the school's efforts. Amherst's team comprises several representatives from the health department and an on-call technical advisor from UMass Amherst; the school itself has only one representative on the team (maintenance director). The school's initial efforts will focus on chemical management (e.g., through a chemical clean-out and the improvements in chemical purchasing practices and storage). After using a matrix approach to prioritize its environmental issues and regulatory obligations, Amherst decided to focus its future efforts on solid waste minimization and energy conservation. However, no formal plans have been made for expansion of the EMS. While the chemical management program will continue after the EPA pilot ends, the EMS team expressed concern about the level of capital investment and staff involvement necessary to sustain additional EMS elements over time.

Saco's Fairfield School is very early in its EMS effort (initiated January 2004). Saco was motivated to explore EMS at the Fairfield School by the closure of another school within the district. According to ALA-ME, Saco has benefited from lessons learned during ongoing EMS efforts at South Portland. Saco's EMS team -- comprising the superintendent, principal, head custodian, nurse, and one teacher -- is working with ALA-ME to hold organizational meetings and create EMS goals. Prioritization efforts yielded indoor air quality and chemical management as high-priority issues. The school is currently developing performance targets and objectives for the EMS.

Wiscasset Middle School made early progress in its EMS, but efforts appear to have stalled in recent months after losing a key member of its core team. The school completed EMS training in 2003 and was working to prioritize its environmental issues before setting EMS objectives. EPA's last formal contact with Wiscasset was in January 2004; the school declined to be interviewed for this evaluation.

Exhibit 3-4

CURRENT STATUS OF EMS AT PARTICIPATING SCHOOLS

EMS Element	Description	Participating School					
		Amherst	Lenox	Newton	Saco	South Portland	Wiscasset*
Environmental Policy	Develop statement of commitment to environment; use as framework for planning and action	✓	✓	✓	✓	✓	
Environmental Aspects	Identify environmental attributes and significance of products, activities, and services	★	★	★	★	★	
Legal and Other Requirements	Identify and ensure compliance with applicable laws and regulations	★	★	★	✓	★	
Objectives and Targets	Establish environmental goals for organization	★	★	★	★	★	
Environmental Management Program	Plan actions necessary to achieve objectives and targets	✓	✓	★		★	
Structure and Responsibility	Establish roles and responsibilities for environmental management	✓	★	★	✓	★	
Training, Awareness, and Competence	Ensure that employees are trained and capable of carrying out environmental responsibilities	★	✓	★	✓	★	
Communication	Establish processes for internal and external communications on environmental management issues		✓	★		★	
EMS Documentation	Maintain information on EMS and related documents	✓	✓	✓	✓	✓	
Document Control	Ensure effective management of procedures and other system documents			✓		✓	
Operational Control	Identify, plan, and manage operations and activities in line with policy, objectives, and targets		✓	✓		✓	
Emergency Preparedness and Response	Identify potential emergencies and develop procedures for preventing and responding to them			✓		★	
Monitoring and Measurement	Monitor key activities and track performance	✓	✓	✓	✓	✓	
Nonconformance and Corrective and Preventative Action	Identify and correct problems and prevent their recurrence	✓	✓	✓	✓	✓	
Records	Maintain and manage records of EMS performance					★	
EMS Audit	Periodically review that EMS is operating as intended						
Management Review	Periodically review EMS with eye to continual improvement						

★ = EMS element developed and activity ongoing
✓ = Activity under development
***** = Information currently unavailable for Wiscasset; EMS efforts have stalled due to loss of key staff. See Chapter 1.

Source: EMS elements based on *Environmental Management Systems: An Implementation Guide for Small- and Medium-Sized Organizations*. Glover-Stapleton Associates, 2001.

Assessment Against the Logic Model

This section outlines the evaluation findings in the context of the K-12 EMS logic model presented in Chapter 1. As noted, through these EMS pilots, EPA hopes to provide financial and technical support for the development of pilot environmental management systems (EMSs) in K-12 schools and determine if EMSs are an effective tool in (1) prioritizing and addressing environmental and health issues; (2) maintaining compliance with State and Federal regulations; (3) incorporating pollution prevention into daily operations; and (4) institutionalizing the concept of continuous improvement in environmental performance.

Inputs and Activities

Funding and guidance from EPA New England has helped establish the groundwork for the K-12 EMS pilot efforts. Through partnerships with MA and ME state agencies, as well as ALA-ME, EPA used towns' and schools' past interest in environmental innovation to target the marketing of the pilots. Participants widely took advantage of EPA-supported technical assistance, including PEER Center, EMS training sessions, and private consultants. In fact, schools named pilot-related technical assistance among the most successful elements of the pilot efforts.

Partners and Participants

EPA successfully enlisted a team of state and federal agencies with broad expertise in health, education, and occupational safety. The number of schools involved is sufficient to pilot school EMSs without overburdening the management capacity of EPA, MA DEP, ALA-ME, or the City of Newton. EPA should continue to work closely with ALA-ME, MA DEP, and the City of Newton to ensure that the participating schools are engaged and progressing. Evidence from the past two years highlights the difficulties associated with maintaining a sustained commitment from schools. In particular, some schools have dropped out of the K-12 EMS pilots (e.g., Farmington and Portland, ME) and others have had extended periods of inactivity (e.g., Wiscasset, ME).

Outputs

Although the K-12 pilot efforts are only at mid-course, EPA has made substantial progress in attaining the outputs outlined in the logic model. A series of grants indirectly provided to participating schools has resulted in EMSs at various stages of development; most schools have conducted or are in the process of conducting facility assessments to establish baseline data. EMS training programs are ongoing at several pilot schools, and preliminary issue prioritization efforts have, in some cases, yielded leverage in securing school funds to make

necessary EMS-related capital improvements.[7] While participants generally have not yet completed school-wide environmental policies or formal EMS documents, all pilot schools intend to do so as the pilots progress; EPA should work closely with MA DEP, ALA-ME, and Newton to ensure that this more formal documentation is produced.

Outcomes: Short-Term, Intermediate, and Long-Term

Pilot schools are generally in the early stages of realizing the short-term outcomes in the logic model. By first ensuring that staff professional responsibilities reflect the EMS, participants are laying the groundwork for the specific activities (e.g., solid waste recycling and energy conservation measures) that are partially underway. Participants generally have not, however, advanced to short-term outcomes such as developing EMS performance goals or conducting EMS self-audits.

Likewise, pilot schools generally have not progressed to the point where they are fully realizing intermediate outcomes -- though some, such as improved integration of budgetary and environmental priorities, are beginning to come to fruition. Measurable health and environmental outcomes will likely be realized on a long-term time frame (i.e., years rather than months), and therefore cannot be evaluated at this time.

[7] For example, in South Portland, school officials used the EMS baseline analysis to make a credible case for several environmentally-related capital improvements. These included (1) raising a chimney located adjacent to air intakes; (2) caulking leaky windows to help abate mold; and (3) replacing worn asbestos tiles.

The progress realized thus far in the K-12 EMS pilot suggests that EMS may represent an effective approach for identifying, comparing, and addressing environmental problems in schools. This preliminary conclusion is supported by evidence from the successful application of EMS in corporate, government, and other settings.[8] Therefore, this chapter translates a variety of the lessons learned from the pilot into concrete steps for expanding EMS use in schools. Specifically, the chapter describes two categories of lessons:

- First, we discuss ways that EPA and other stakeholders can build on the K-12 EMS pilot efforts and promote EMS use in the schools sector.

- Second, we draw on the pilot experience to offer guidance to schools considering EMS for the first time.

PROMOTING EMS IN THE SCHOOLS SECTOR

This section identifies and builds on the lessons learned thus far under the K-12 EMS pilot efforts. One key goal of the program is to increase schools' understanding of EMS, establish self-sustaining EMSs at pilot schools, and thereby promote voluntary EMS use in other school systems. The lessons below focus on ways that EPA, other agencies, and other stakeholders can expand EMS use and ultimately achieve better environmental results in schools. The lessons include the following:

- Publicize the results of the pilots;
- Continue integrating EMS with enforcement and awareness efforts;
- Offer system-oriented tools;
- Arrange networking and training sessions;
- Develop list of preferred consultants;
- Offer grant funding for performance monitoring; and
- Establish inter-agency coordination.

[8] See, for example, "Environmental Management Systems: Do They Improve Performance?" prepared by the Department of Public Policy, University of North Carolina, Chapel Hill, prepared for U.S. EPA Office of Water and Office of Policy, Economics, and Innovation, January 2003.

Publicize Pilot Results

EPA New England may wish to consider alternatives for publicizing the results of the K-12 EMS pilot efforts. Norm Anderson of the American Lung Association of Maine noted that many schools are interested in EMS, but want to see a working model before they commit time and resources to developing an EMS. Consistent with the overall intent of the pilot efforts, the experience gained under this program could be very instructive to schools considering EMS.

A number of options exist for publicizing the results of the pilot effort. First, simply making this mid-course evaluation available at EPA New England's website may help raise schools' awareness of EPA's EMS efforts. Second, once the pilot efforts are complete, it may be helpful to develop case studies of the participating schools, noting key characteristics such as the following:

- School history and motivation for developing an EMS;
- Features of the school(s) covered by the EMS (e.g., age of building, square footage, student population, etc.)
- Makeup of EMS development team;
- Role of consultants and other supporting individuals (e.g., mentors);
- Major environmental problems identified;
- Major health and safety projects undertaken as a result of EMS findings; and
- Overall resources (i.e., time and money) associated with the EMS effort.

These case studies could be offered separately or packaged together in an overview report that contrasts the experiences of the schools and the lessons learned. EPA should work with stakeholders to develop and distribute the cases studies; possible partners may include school districts, private schools, or national educational organizations such as the National School Board Association, teachers' unions, or the national Parent Teacher Association.

Continue Integrating EMS with Enforcement and Awareness Efforts

Some of the non-pilot schools (e.g., Waltham) interviewed for the evaluation developed their EMS as part of a settlement agreement established subsequent to an enforcement action.[9] EPA may wish to consider how the enforcement process may help target schools with environmental issues and serve as a vehicle for promoting EMS. Possible approaches include the following:

- One option is to promote EMS through EPA's Supplemental Environmental Project (SEP) policy. SEPs can be included in settlement agreements and are defined as environmentally beneficial projects that a violator agrees to pursue, but which are not legally required to achieve

[9] Concern over potential enforcement actions does not appear to be a major factor motivating schools to pursue EMS. However, this evaluation did not explicitly examine the pros/cons of enforcement efforts in the school sector.

basic compliance. Typically, the settlement penalty is lowered for the violator who agrees to an SEP, meaning that the project is implicitly funded through the settlement agreement. In some cases, a violator implements an SEP that focuses on a third party; for example, a university or business that is the subject of an enforcement action might assist a local elementary school in developing an EMS or fund contractor or other support for the EMS process.

- Schools that are the subject of an enforcement action or which otherwise have environmental compliance problems could be required to attend EMS training.

- Some pilot schools interviewed for this evaluation were hesitant to pursue EMS for fear of uncovering costly and/or disruptive environmental liabilities. EPA may wish to consider flexible compliance arrangements for schools that pursue an EMS approach; for example, EPA could grant penalty relief or an extended time frame for addressing discovered problems.

Furthermore, some interviewees (Newton, Quabbin) noted that the environmental management checklists (e.g., the Massachusetts multi-agency checklist) were instrumental in making them aware of their compliance obligations and in encouraging them to explore EMS. In Maine, the Department of Education's Facilities Template serves similar purposes: it guides schools through a maintenance plan (including multi-agency checklists), a facility assessment, and a 10-year capital renewal plan. Given their importance in Massachusetts and Maine, such checklists should be developed in other states and made more widely available to interested schools.[10] In addition, EPA may wish to consider tying EMS into awareness efforts more explicitly. For instance, the Tools for Schools document entitled "Resource Guide for Schools" could be revised to provide basic information on EMS and its role in addressing environmental issues commonly confronting schools (e.g., indoor air quality, lead, asbestos) and direct schools to more detailed literature or case studies examining schools that implemented an EMS.

System-Oriented Tools

When asked how EPA could improve the support tools it offers, one consultant mentioned that guidance materials offered to schools and their partners could be more "system-oriented." The feeling was that available tools tend to be media- or problem-specific. For instance, while Tools for Schools can be helpful, it focuses on indoor air quality. Likewise, other materials focus on toxics reduction and waste management. The respondents felt that few materials provide a broad-based view of the school environment and the suite of potential health risk sources that may exist.

[10] Environmental management software will be more available in the future, when the Office of Children's Health Protection releases the Healthy Schools Environmental Assessment Tool for pilot testing in early 2005. The basis of this software is an embedded environmental assessment checklist.

Through the EPA grants and cooperative agreements which funded the pilot efforts, contractors assisted in providing EMS training to New England schools. To the extent that this training can be continued and offered more widely, it may help interested schools develop a more integrated environmental view of their facilities. It may also be beneficial to offer more detailed informational materials on-line, with a focus on the practical steps of implementing EMS in schools, since some schools may find it difficult to sacrifice staff time for training sessions. These materials could include detailed EMS examples based on the experience of schools involved in the current pilot. The sample materials could include walk-through protocols, procedure descriptions, prioritization matrices, summaries of legal and regulatory requirements, and environmental policy statements.

Networking and Training Sessions

To establish long-term incentives for voluntary EMS in schools, it is important to have a forum for the exchange of information and ideas. First, school officials may be most responsive to their peers. Therefore, once the current EMS pilot has matured, the participants may want to convene a small conference to review the successes, failures, and challenges associated with implementation of their EMSs.[11] Likewise, an expanded version of this conference could involve EPA, other government agencies, and EMS experts from academia and business. In both cases, the target audience would be schools considering EMS. The program could include information on EMS concepts, the benefits of EMS implementation, practical steps involved in the EMS process, likely resources demanded by the process, and other fundamental information needed to help newcomers explore whether EMS is appropriate for their individual school or school system.

List of Preferred Consultants

The pilot schools interviewed consistently expressed satisfaction with their respective consultants and considered the intellectual and organizational support essential to their progress thus far. Both state DEP interviewees noted that some schools (outside of the pilot) attempted to manage their EMS independently but ultimately ended up seeking consultant support. These findings suggest that, until schools become more familiar with EMS, they may need initial consultant involvement to facilitate their EMS efforts.

EPA is prohibited from recommending consultants or contractors to regulated entities. However, the schools, ALA-ME, and other pilot participants may wish to develop a list of preferred EMS consultants with whom they have worked. The list could highlight the expertise of each consultant (e.g., school enforcement/compliance issues, engineering, EMS development, organizational support, facilities expertise) and provide contact information. The list could also highlight consultants who work well with non-technical EMS teams and know how to tailor EMSs to unique settings. Coupled with the more detailed EMS procedural materials recommended in this chapter, this list would help interested schools pursue EMS independently.

[11] Interviewees representing the Quabbin schools recommended this type of mentoring/support program.

Grant Funding for Performance Monitoring

The systematic approach of EMS creates the opportunity for schools to track results and measure success; EPA should work with schools to facilitate this process. Much of the funding provided through the K-12 EMS pilot has been devoted to the earlier stages of EMS development, such as walkthroughs and prioritization exercises. Pilot schools (e.g., Amherst) and one consultant interviewed for the evaluation expressed concern over their ability to sustain their EMSs in the long run, i.e., once EPA funding is exhausted. Given widespread reductions in municipal budgets, EMS performance monitoring and measurement will increasingly be viewed alongside competing school priorities.

Long-term activities pursued under an EMS include prioritizing environmental issues, identifying potential programs to address problems, and measuring impacts. Most notably, implementation should include monitoring environmental improvements achieved as a result of the EMS effort. Although additional grant funding is not readily available, EPA may wish to consider funding a monitoring and performance measurement exercise at several pilot schools. Such "full-cycle" pilots would be instrumental in demonstrating the practical demands of measuring health and environmental outcomes and would help illustrate the ultimate goals of EMS efforts. Overall, such an exercise may make a more compelling case in favor of EMS in schools.

Inter-Agency Coordination

Promoting the use of EMS in schools will require continued coordination between public agencies, both regulatory and non-regulatory. School environmental management lies at a crossroads between numerous authorities: environmental, education, occupational safety, health, and agricultural agencies at both the state and Federal level all play a role. While environmental and health authorities have the technical and legal expertise to assist in EMS development, education officials typically interact with schools more frequently, provide funding for school construction and renovation, and manage the accreditation of schools. Therefore, they know the school setting and are in a better position to persuade school district decision-makers that innovative approaches are worth pursuing.

The K-12 EMS pilot efforts benefited from the involvement of EPA New England, the Massachusetts and Maine Departments of Environmental Protection, the Massachusetts and Maine Departments of Education, and the National Institute for Occupational Safety and Health (NIOSH). However, the interviews conducted for this evaluation suggest that some of these participants had limited roles.[12] To expand school EMS use from the pilot level to a larger scale, the relevant agencies should establish more formal coordination, ensuring that EMSs help satisfy the interests of each agency and bring the expertise of each agency to bear. Likewise,

[12] For example, the Maine DEP interviewee indicated that DEP receives periodic progress updates but currently has no substantive role in the pilot.

consolidating and reconciling the regulatory requirements of EPA, state DEPs, state labor departments, and the Occupational Safety and Health Administration would give schools the confidence that they are covering all the necessary bases with an EMS.[13] As such, a visible collaboration between these agencies may implicitly encourage schools to pursue EMS because they would view it as a means to demonstrating their environmental management commitment to multiple authorities.

LESSONS FOR SCHOOLS CONSIDERING EMS

The evaluation also suggests a second set of lessons that may be helpful to schools considering EMS in the future. Exhibit 4-1 summarizes the lessons, illustrating where they apply in the standard "plan, do, check, correct" model of EMS. The lessons include:

- Understand environmental obligations;
- Form a core team;
- Formulate an environmental policy;
- Establish a balanced role for outside experts;
- Secure funding and support;
- Develop a public involvement strategy; and
- Define indicators and monitor progress.

The following sections discuss these lessons in greater detail.

Understand Environmental Obligations and Opportunities

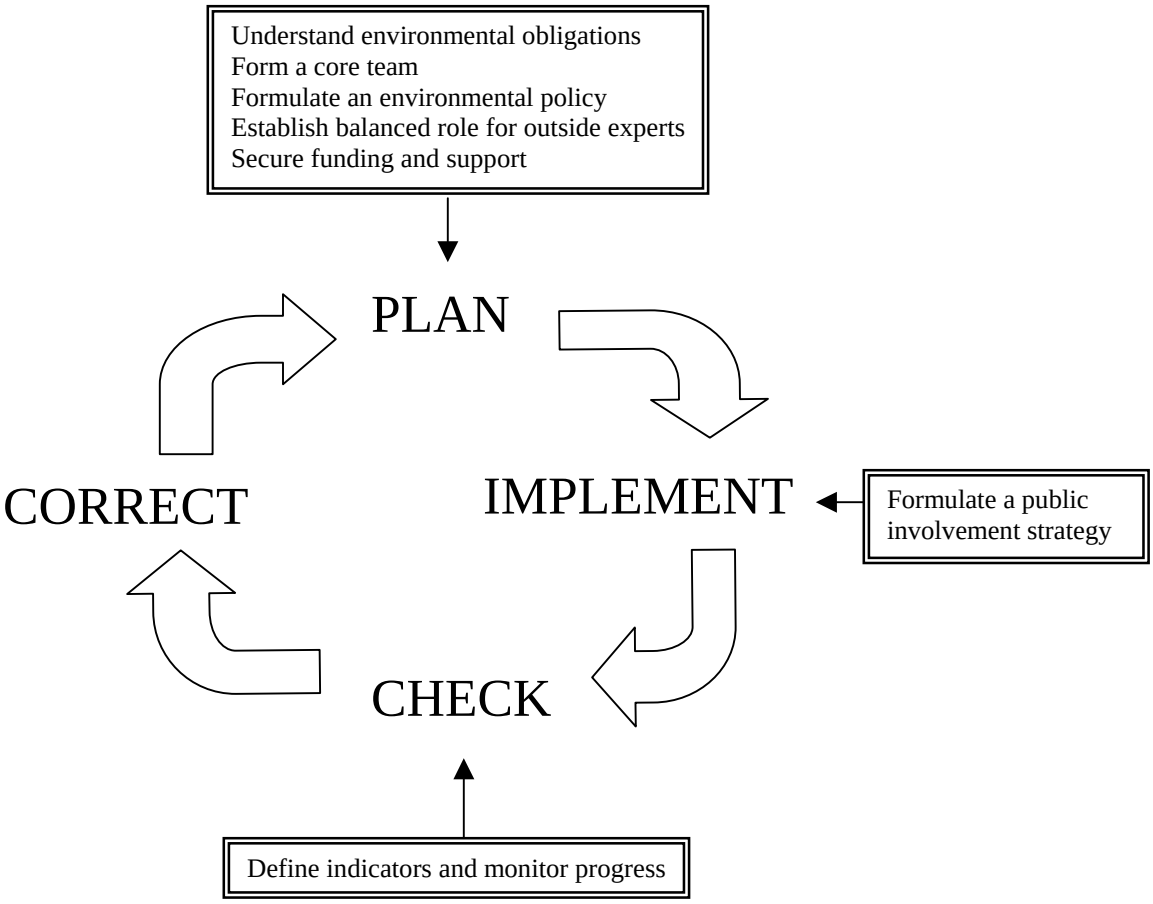
To make sound decisions on whether EMSs are appropriate, schools should first become fully familiar with the environmental, health, and safety obligations they face. EMS users generally do not choose the approach solely based on a desire to achieve regulatory compliance; however, the EMS should be premised upon a basic understanding of legal requirements. A variety of sources offer schools information on environmental responsibilities:

- EPA maintains a Healthy Schools Environment website at www.epa.gov/schools. The site is a gateway to a variety of on-line resources designed to help schools manage their environmental affairs. Major information topics include chemical use and management; school design, construction and renovation; energy efficiency; indoor environmental quality; and waste management.

[13] This kind of coordination was demonstrated in the multi-agency checklists developed in preparation for the baseline assessments at the K-12 EMS pilot schools.

Exhibit 4-1

LESSONS FOR
SCHOOLS CONSIDERING EMS



- The National Clearinghouse for Educational Facilities (NCEF) is a free public service that provides information on planning, designing, funding, building, improving, and maintaining schools. The NCEF is funded by a grant from the U.S. Department of Education. The NCEF website (www.edfacilities.org) covers broad topics (e.g., school design, operating costs) but includes components focusing on environmental health and safety, such as pest management, indoor air quality, and water quality.

- The K-12 EMS pilot efforts have demonstrated that indoor air quality continues to be a motivating factor in selection of an EMS approach. As part of the Tools for Schools program, EPA maintains a website (http://www.epa.gov/iaq/schools/) devoted to indoor air quality management in schools. The site provides case studies and other information on successful IAQ management techniques.

- EPA's Office of Children's Health Protection provides specialized information on environmental risks facing children at http://yosemite.epa.gov/ochp/ochpweb.nsf/homepage. This office has been leading the effort to develop a national Healthy Schools Environmental Assessment Tool, which will be pilot tested in early 2005.

- The Maine Facilities Management Template and Massachusetts multi-agency schools checklist provide guide schools in evaluating environmental, health, and safety responsibilities. Although these are state specific checklists, must of the information is applicable nationally. See http://www.maine.gov/education/const/FMThomepage.htm as well as http://www.mass.gov/dph/beha/iaq/schools/schools.htm.

In making a decision to explore EMS further, schools will also need to develop a rudimentary understanding of EMS concepts. At http://www.epa.gov/ems/, EPA provides basic background on EMS. Similar technical information can be accessed at http://www.peercenter.net/. While much of the information at these sites is designed for corporate environmental managers, many of the concepts are readily translated to a school setting.

Form a Core EMS Team

Schools involved in the K-12 EMS pilot found that the composition of their EMS team was an important aspect of the initial EMS planning process. Diverse membership accomplishes several goals. First, it ensures that the proper expertise will be brought to bear in the EMS. Second, it ensures that various groups within the organization will have a role and feel invested in the EMS. Finally, it helps guarantee that the loss of one individual (e.g., due to retirement or placement at a new school) will not bring EMS development and implementation to a halt.

The appropriate membership for the EMS team will vary greatly depending on the size of the school or school system, the age and condition of the school facilities, the expertise of

individual members, the availability of resources for hiring outside experts, and other factors. Within the school system, possible members of the EMS team include administrators (e.g., superintendents, principals), facilities staff, teachers, nurses, cafeteria staff, and students. Looking outside the school, potential team members include parents, municipal public health officials, and municipal fire and safety officials. Finally, the K-12 EMS pilot evaluation has highlighted the potential role of outside experts. To select a consultant or other expert, schools may wish to consult the National Directory of EMS Technical Assistance Providers available at http://www.peercenter.net/ or contact pilot or other school facilities for their individual recommendations. Likewise, the list of preferred consultants recommended earlier would also provide guidance for choosing outside support experts.

Formulate an Environmental Policy

Schools embarking on an EMS project should craft an environmental policy statement that lays out the team's environmental health and safety objectives for the school. This type of broad policy statement is generally considered the first step in developing an EMS. It can help establish the fenceline for the EMS (i.e., what operation are covered); lay out goals for the EMS effort; and demonstrate the commitment from upper-level managers (see below). Later in the EMS process, the policy provides a reference point, allowing participants to step back and determine if the EMS is helping satisfy broad goals. It also provides continuity to environmental management efforts, helping overcome staff changes common in schools.

Establish Balanced Role for Outside Experts

Many of the evaluation interviewees (all participating schools, ALA-ME, MA/ME DEP) highlighted the critical role of consultants in helping educate school staff, plan EMSs, and organize various aspects of the EMS effort. Some school staff went so far as to state that the effort would never have proceeded without consultant support. Several key factors should be kept in mind when considering the use of outside experts:

- First, the schools in the K-12 EMS pilot efforts made use of outside consultants partly because the grants awarded under the pilot provided for such support. In some instances, schools may not have resources available to hire paid experts to guide the organizational or technical aspects of their EMS. Hiring such experts should not be viewed as a prerequisite to undertaking an EMS. As noted throughout this report, a variety of free on-line resources can provide guidance for EMS development. In addition, schools may be able seek technical support from state agencies and non-profit organizations involved in school environmental management and public health.

- If the school does decide to hire a consultant, the consultant should not be the sole motivator in the EMS process. Schools should feel a sense of ownership over the EMS and not feel that ideas are being imposed upon them. An EMS is most successful when there is vision and leadership

behind its development and when it is used to further the overall goals of the organization. While school staff should extract procedural direction, technical guidance, and organizational support from consultants, they should be careful to retain final authority over key decisions.

- Establishing a balanced role for outside experts is critical to keeping the EMS self-sustaining. School staff on the EMS team should educate themselves while the expert is involved. In this way, when the expert is no longer actively involved (e.g., because available funding is exhausted), the remaining team members can carry on with the implementation and maintenance of the EMS.

In addition to seeking expert assistance, schools should take advantage of mentoring opportunities with other schools developing and implementing EMS. Such partnerships may facilitate the transfer of strategies and best practices between similarly-situated schools.

Secure Long-Run Funding and Support

As noted, some of the pilot schools as well as MA DEP expressed concern over how the EMS effort would proceed once initial funding from the pilot program was exhausted. Because school staff have shifting responsibilities and because school budgeting is a complex process, it is important to chart a long-term course for the EMS effort. This may involve establishing multi-year roles for project participants and identifying funding needs and sources over the long term.

Finding adequate staff and funding often hinges on securing the support of upper-level administrators as well as town officials. The EMS team should carefully plan the content and timing of interactions with school and town officials. First, EMS concepts should be presented in thorough but simple terms and the EMS organizers should "sell" the EMS on the basis of its fundamental advantages, i.e., the EMS is internally developed and can help highlight problems or inefficiencies that are leading to environmental, health, and safety problems. In addition, EMS organizers can promote the approach on the basis of benefits that may be appealing but not immediately evident to school and town officials. Based on interviews conducted for this evaluation, these advantages may include the following:

- Some aspects of an EMS, such as energy efficiency and waste minimization, may be money savers.

- An EMS may decrease liabilities by preventing non-compliance with regulations and subsequent fines from environmental agencies. Likewise, an EMS may eliminate or reduce health damage claims by employees or students, reducing legal and settlement costs.

- In contrast to the "fire-fighting" approach, EMS can help schools save money by providing a mechanism to institutionalize and maintain improvements and knowledge once established.

- EMS findings may inform capital improvement decisions or other budgeting decisions, helping the school system target funding where it is most beneficial.

- Consultants in Maine felt that having an EMS in place could increase the credibility of environmental management needs and help secure state funding for necessary improvements to the school physical plant.

- An EMS can also provide an entrée into state and federal recognition programs for the schools (e.g., National Environmental Performance Track) where the schools also receive incentives for participation.

Securing adequate resources will help ensure that the EMS effort maintains momentum and accomplishes its objectives. The pilot participants used the K-12 grant funding in a variety of ways, but two uses were mentioned most prominently. First, the consultants supporting the technical and organizational aspects of the effort represented a significant expense. Second, funds were used to secure the involvement of key EMS team members, particularly teachers. For example, funds in Maine were used to supplement the salaries of teachers on the EMS team or to hire substitute teachers to cover classes during daytime EMS team meetings.

Because school budgets are almost universally short on discretionary funding, EMS organizers may wish to consider alternative sources of funding. While a comprehensive listing of potential funding sources is beyond the scope of this study, the U.S. EPA manages a variety of grant programs that represent a good starting point in the search for funding. First, EMS efforts may qualify for funding under various programs that support community-based environmental protection (CBEP). For instance, through a program entitled Environmental Justice Grants to Small Community Groups, EPA funds technical assistance and other aspects of projects that involve minority or disadvantaged populations disproportionately affected by pollution. A complete listing of CBEP-related grant programs is available at http://www.epa.gov/ecocommunity/matrix.htm. Numerous other EPA grant programs target mitigation of specific environmental problems that may warrant attention once the EMS is in place. For instance, through its Pesticide Environmental Stewardship Program (PESP), EPA funds integrated pest management efforts.

Schools considering EMS should not overemphasize the role of funding. While EMS development is demanding, the out-of-pocket expenses can be quite limited. Many of the resources invested in the EMS are in-kind expenses, e.g., the intrinsic cost of individuals' time. Because schools vary greatly in terms of their facilities, environmental challenges, and level of available technical expertise, it is difficult to offer a range of potential out-of-pocket expenses associated with EMS development. However, if schools craft their EMS team carefully and take advantage of in-kind resources, they may find that an EMS is feasible with limited funding.

Formulate a Public Involvement Strategy

The interviews conducted with pilot schools suggest that public involvement in the EMS process was limited. To the extent that schools seek public involvement, it generally is limited to informing parents and other stakeholders of the status of the EMS effort through websites or other media.

Schools undertaking EMS may wish to focus greater attention on systematically involving the public in the EMS process. Both Massachusetts and Maine Department of Education officials interviewed for this evaluation highlighted how more explicit public involvement can bridge the gap between schools and municipalities, making the public see school health, safety, and environmental management as a shared responsibility, rather than seeing schools as entities separate from the community. Interested parties may include the public works director, fire department officials, public health officials, medical experts at local health care institutions, and parents.

A consultant with expertise in school environmental management, suggests that separate communications strategies be developed for different public stakeholder groups. These groups can be organized along two dimensions: (1) their level of interest in school environmental management; and (2) their potential impact on the EMS process and in school environmental management in general. For instance, information tailored to parents (high interest, low impact) might be very different from information geared to the local public health department (high interest, high impact). These dimensions can be used in outreach to key groups and in formulating an overall public involvement strategy for the EMS. These communication strategies should anticipate those environmental aspects and impacts that the key groups may feel strongly about.

Define Indicators and Monitor Progress

Interviews conducted for this evaluation also suggest that schools developing EMSs should place greater emphasis on the "check" and "correct" stages of the EMS model. The basic intent of these stages is to monitor the performance of the EMS using selected health indicators and other outcome indicators, and modify the EMS consistent with the information collected. For instance, the school nurse might keep records of the number of student complaints (e.g., headache, eye irritation) before and after new ventilation equipment has been installed in a school laboratory. Changes in this indicator will help determine if the EMS has properly identified key indoor air quality problems or if additional environmental management actions are necessary.

The training manual for staff preparing Waltham's EMS identified four characteristics of "environmental targets" (i.e., objectives) that can be applied to assess the impact of the EMS: (1) the target should tie to overall EMS objectives; (2) it should state a detailed performance requirement; (3) it should be quantitative when practical; and (4) meeting the target should be a

necessary prerequisite to achieving a particular EMS objective.[14] An example would be "reduce generation of hazardous waste by 50 percent by the end of 2007."

Thus far, none of the pilot schools have established these types of discrete performance targets (although ALA-ME is currently developing an indicators system that could be applied in the school environment, and an upcoming University of Southern Maine grant proposal seeks to link facilities- and health-related metrics to provide more comprehensive assessments). This kind of monitoring and adaptive management is critical to EMS development and will help schools achieve continual improvements in environmental quality.

[14] "Environmental Management System Training Manual, Waltham Public Schools," prepared by Camp Dresser & McKee, Inc., prepared for Massachusetts DEP Northeast Regional Office, 2001.

Appendix A

Introduction to EMS Concepts

The attached primer provides an overview of environmental management system (EMS) concepts. This article and other descriptive materials are available at www.epa.gov/ems/. Note that the primer language focuses on corporate EMS applications. Most of the concepts are equally applicable in other settings such as K-12 schools, universities, and government facilities.

Environmental Management Systems (EMS) Primer

August 2003

An Environmental Management System (EMS) provides a systematic way to review and improve operations for better environmental performance. Through an EMS, environmental considerations are incorporated into your organization's overall business decision-making structure. This approach differs from traditional environmental programs, as shown below.

Traditional Environmental Programs	EMSs
Environmental issues are the concern of the EH&S group	An EMS integrates environmental decision-making with all other business functions such as design, purchasing, quality, operations, etc.
Compliance is the primary environmental goal.	Environmental goals, including compliance, are set by the company
Based on treatment/end-of-pipe control	Management of environmental issues is proactive
Results in reacting to regulations	Results in continuous environmental improvements. EMSs help achieve compliance and beyond-compliance environmental protection, as well as, improved resource efficiency.

Benefits of EMS Implementation

Although most of the literature describes expected benefits from implementing an EMS, the following are reported benefits:

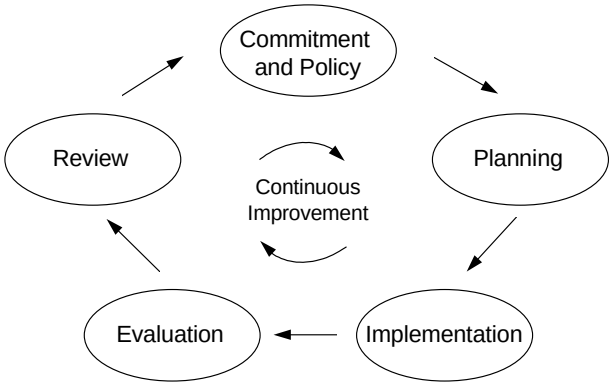
An EMS is a framework for systematically managing and addressing the environmental impacts of your business.

- Enhanced awareness of environmental issues among employees, resulting in improved morale and operations
- Improved procedures and documentation
- Improved regulatory compliance, expected or experienced
- Improved environmental performance (e.g., reduction in hazardous waste generation, improved emergency response preparedness and response procedures, identification and implementation of pollution prevention projects involving materials substitution)
- Reduced environmental management costs (e.g., hazardous waste disposal costs)
- Access to international markets

Sources: NSF International, *Environmental Management System Demonstration Project: Final Report* (1996). John Pastuck, "Permitting Change at Formosa Plastics Corporation, U.S.A.: The Business Value of ISO 14001 Certification," *Corporate Environmental Strategy* (Autumn 1998).

Overview of EMS Framework

The most commonly used framework for an EMS is the one developed by the International Organization for Standardization (ISO) for the ISO 14001 standard. Established in 1996, this framework is the official international standard for an EMS.



The five main stages of an EMS, as defined by the ISO 14001 standard, are:

1. Commitment and policy

- Create an environmental policy based on what is important to your company.
- Management commitment to the policy is critical.

2. Planning

- Identify legal requirements.
- Understand how your company currently impacts the environment by reviewing operations to identify the environmental *aspects* and impacts of your company's activities, products, and services.
- Determine which environmental aspects are significant based on the criteria that are important to your company (e.g., risk to worker health, resource use, etc.).
- Set objectives to reduce the environmental impact of your significant environmental aspects.
- For each objective, set a measurable target.

3. Implementation

- For your objectives, develop projects to make desired changes in processes, work procedures, or procurement to meet your targets.
- For significant environmental aspects where you do not set an objective, develop operational controls and manage them to minimize environmental impact.
- Assign roles and responsibilities, and develop training, communication, documentation, and an emergency management plan to ensure that environmental targets are met.

> ***Environmental aspects*** *are elements of your business' activities, products, or services that can interact with the environment.*

4. Evaluation

- Set up a schedule and a process to review progress toward meeting your objectives and targets.
- Measure your success in meeting targets.
- If needed, take corrective action.

5. Review

- To ensure success and continuous improvement, regularly review your EMS's effectiveness as a system including internal EMS audits.
- Schedule management reviews to check on progress of meeting your policy, objectives, and targets.
- Modify the EMS to optimize its effectiveness.
- The review stage creates a loop of continuous improvement for the company.

EMS Development

An EMS is typically developed through group discussions. Best results are achieved by involving employees from all areas and levels of the company in some way. There are two benefits to involving all employees: first, they will be more likely to take ownership of managing environmental concerns; second, they often have valuable insight into how improvements can be made. Most companies find that it takes about a year to work through the EMS development process. And it generally takes up to three years for the EMS to be fully understood and implemented. Developing an EMS is a commitment to change and change takes time. On average an EMS has a payback time of 1.5 years.

Every choice you and your employees make can affect the environment. Involving everyone helps produce cost-effective long-term results.

What is EPA Looking for in an EMS?

EPA issued its "Position Statement on EMS" and its "EMS Implementation Policy" for EPA facilities in May 2002. EPA encourages the widespread use of EMSs across a range of organizations and settings, with particular emphasis on adoption of EMSs to achieve improved environmental performance and compliance, pollution prevention through source reduction, and continual improvement. EPA encourages organizations to use recognized environmental management frameworks, such as ISO 14001 standard.

Further Information?

For further information on EMSs at EPA, go to www.epa.gov/ems

Appendix B

Discussion Guides

Discussion Guide for Schools Participating in EPA New England K-12 EMS Program

1. Motivation and Awareness

1.1 Prior to joining the K-12 EMS program, were you already exploring implementation of an EMS?

1.2 What factors motivated you to develop an EMS for your school?

1.3 How did you first hear of the EPA K-12 EMS pilot program?

1.4 What advantage did you see in joining the K-12 EMS pilot program?

1.5 Who made the decision to participate in the K-12 EMS program?

1.6 Were there groups/individuals whose support was important to participating in the program? How did you win the support of these groups/individuals?

1.7 How did your understanding of EMS change over the course of the project?

1.8 What are the overall goals of your EMS?

1.9 What responsibilities do you have under the EMS? Do these represent a significant change or expansion of your professional responsibilities?

2. EMS Development and Implementation

2.1 What is the current status of your EMS development effort?

2.2 Who was involved in developing and implementing your EMS (e.g., third party, internal)?

2.3 From whom did you receive technical support during the development and implementation of your EMS?

2.4 What role did EPA New England play in facilitating the development and implementation of your school's EMS? Did you find EPA's involvement helpful?

2.5 Did your consultant play a primary role (i.e., handling the bulk of the work) or a support/advisory role during EMS development and implementation?

2.6 How did you prioritize environmental issues and assess regulatory obligations?

2.7 How would you rate EPA's technical support and outreach tools?

2.8 How could EPA improve its outreach and technical support efforts?

2.9 If relevant, how would you rate technical support that you may have received from sources other than EPA?

2.10 What were the biggest challenges related to developing and implementing an EMS?

2.11 What level of resources (staff, financial) has your school committed to the development/implementation of its EMS?

2.12 Did you employ public involvement strategies during EMS development? If yes, describe these strategies.

2.13 How did you resolve concerns (if any) about public involvement during EMS development?

2.14 Does your school have an official Environmental Policy that: outlines EMS implementation responsibilities; dedicates resources for future implementation stages; and defines performance indicators to assess progress?

3. Activities and Outcomes

3.1 What were the highest-priority environmental issues at your school?

3.2 Has your EMS resulted in short-term changes to environmental management practices?

3.3 Has your EMS resulted in long-term changes to environmental management practices? If no changes yet, is this an explicit objective of your EMS?

3.4 Can you quantify the impact of these changes (short or long-term)?

3.5 Do you have plans for measuring the impact of the EMSs (i.e., environmental progress) and if so, what are those plans?

3.6 Has your school derived benefits from the EMS? If yes, please describe.

3.7 Has involvement in EMS development and implementation helped to build long-term local capacity to address environmental concerns (e.g., reduced need for EHS crisis management; identification and prioritization of long-term infrastructure needs)?

4. Overall

4.1 Are you satisfied with the K-12 EMS program thus far?

4.2 What aspects of the K-12 EMS program have you found most useful/effective? Least useful/effective?

4.3 What aspects of the program will you continue after the pilot ends?

Discussion Guide for Other EMS Schools

1. Motivation and Awareness

1.1 What factors motivated you to develop an EMS for your school?

1.2 Were you aware of EPA's K-12 EMS program when you initiated your EMS?

1.3 What are the overall goals of your EMS?

1.4 What responsibilities do you have under the EMS? Do these represent a significant change or expansion of your professional responsibilities?

2. EMS Development and Implementation

2.1 What is the current status of your EMS development effort?

2.2 Who was involved in developing and implementing your EMS (e.g., third party, internal)?

2.3 How did you prioritize environmental issues and assess regulatory obligations?

2.4 What were the biggest challenges related to developing and implementing an EMS?

2.5 From whom did you receive technical support during the development and implementation of your EMS?

2.6 How would you rate EPA's technical support and outreach tools?

2.7 How could EPA improve its outreach and technical support efforts?

2.8 If relevant, how would you rate technical support that you may have received from sources other than EPA?

2.9 What level of resources (staff, financial) has your school committed to the development/implementation of its EMS?

2.10 Did you employ public involvement strategies during EMS development? If yes, describe these strategies.

3. Activities and Outcomes

3.1 What were the highest-priority environmental issues at your school?

3.2 Has your EMS resulted in short-term changes to environmental management practices?

3.3 Has your EMS resulted in long-term changes to environmental management practices? If no changes yet, is this an explicit objective of your EMS?

3.4 Can you quantify the impact of these changes (short or long-term)?

3.5 Do you have plans for measuring the impact of the EMSs (i.e., environmental progress) and if so, what are those plans?

3.6 Has your school derived benefits from the EMS? If yes, please describe.

3.7 What parts of your EMS program will continue into the future? How long will they continue?

Discussion Guide for Non-Participants

1. Overall

1.1 What factors initially motivated you to develop an EMS for your school?

1.2 How could EPA improve its outreach and technical support efforts?

1.3 How did your understanding of EMS change over the course of your involvement?

1.4 Who made the decision to participate in the K-12 EMS program? What factors influenced this decision?

1.5 During the time you were involved with the program, what were the most challenging aspects of your participation?

1.6 Who made the decision to withdraw from the program? What factors influenced this decision?

1.7 Did you proceed with development of an EMS after withdrawing from the K-12 EMS program?

- 1.7.1 Why or why not?
- 1.7.2 If yes, what level of resources (staff and financial) has your school committed to the development and implementation of its EMS?
- 1.7.3 From whom did you receive technical support during the development and implementation of your EMS?

Discussion Guide for State Agencies and Non-Profits

1. Motivation and Awareness

1.1 What factors motivate schools to develop EMSs?

1.2 What role did your agency/organization play in recruiting participants for the K-12 EMS program?

2. EMS Development and Implementation

2.1 Did your agency/organization have a direct role in supporting EMS development? Do you feel your support was effective?

2.2 What were the most common challenges faced by schools developing and implementing an EMS?

2.3 How would you rate the utility of EPA's technical support and outreach tools?

2.4 How could EPA improve its outreach and technical support efforts?

2.5 In schools that developed their own systems using the assistance of consultants, facilitators or trainers, how did this process affect the eventual outcomes attained (i.e., did EMSs developed with some degree of consultant assistance fare better than internally-developed EMSs in terms of: making faster progress towards EMS development; gaining buy-in from key stakeholders; obtaining required funding; developing more comprehensive environmental management practices; fostering improved documentation and understanding; achieving a good fit with the school and its community)?

2.6 In your opinion, are public involvement strategies effective? If yes, which ones?

2.7 How did different strategies for identifying and collaborating with the pilot communities alter the development and effectiveness of the EMS?

3. Activities and Outcomes

3.1 Which environmental management issues are of the highest-priority in participating schools?

3.2 What are the likely environmental and behavioral outcomes of implementing an EMS at schools?

3.3 How do the anticipated outcomes compare to the attained outcomes?

3.4 What sorts of benefits have schools realized as a result of their participation in the K-12 EMS program?

4. Overarching

4.1 Based on your experience, are EMSs feasible and desirable in a school setting?

4.2 How do school EMSs compare with EMSs in industry or government facilities (e.g., in terms of development process, final result, level of external support required, process of building internal support, attention paid to human health and safety issues, level of team participation, barriers to success)?

Discussion Guide for EPA New England

1. Motivation and Awareness

1.1 How did EPA publicize the K-12 EMS program and encourage participation?

1.2 Were outreach efforts targeted at key decision-makers in schools?

2. EMS Development and Implementation

2.1 What were the biggest challenges faced by schools during EMS development and implementation?

2.2 From whom did schools generally receive technical support during EMS development and implementation?

2.3 How would you rate the utility of EPA's technical support and outreach tools?

2.4 How could EPA improve its outreach and technical support efforts?

2.5 In schools that developed their own systems using the assistance of consultants, facilitators or trainers, how did this process affect the eventual outcomes attained (i.e., did EMSs developed with some degree of consultant assistance fare better than internally-developed EMSs in terms of: making faster progress towards EMS development; gaining buy-in from key stakeholders; obtaining required funding; developing more comprehensive environmental management practices; fostering improved documentation and understanding; achieving a good fit with the school and its community)?

2.6 In cases (if any) where consultants played the primary role in managing EMS development and implementation, do you perceive any potential for decreased long-term institutional value at schools (i.e., would schools learn more if they played a more active role)?

3. Activities and Outcomes

3.1 What are the two or three highest-priority environmental issues facing schools in New England? To what extent do schools' EMSs address these issues?

3.2 What environmental and behavioral outcomes do you anticipate will be least- and most-difficult to attain at schools?

4. Overarching

4.1 In your view, has the K-12 EMS program been successful? What aspects have been most effective? Least effective?

4.2 How do school EMSs compare with EMSs in industry or government facilities (e.g., in terms of development process, final result, level of external support required, process of building internal support, attention paid to human health and safety issues, level of team participation, barriers to success)? Can EPA improve future outreach and assistance by recognizing these differences?

4.3 In your view, to what extent do schools' EMSs differ in terms of their content, priorities, and development process?

Discussion Guide for Consultants

1. Motivation and Awareness

1.1 How was your firm selected to support [ ] school's EMS?

1.2 Did your firm have a previous relationship helping [ ] school or other schools manage environmental obligations?

2. EMS Development and Implementation

2.1 How did you prioritize environmental issues and assess regulatory obligations?

2.2 What were the biggest challenges related to developing and implementing the school's EMS?

2.3 How would you rate the utility of EPA's technical support and outreach tools?

2.4 How could EPA improve its outreach and technical support efforts?

2.5 Have you worked with other (non-EPA) technical support and outreach tools that you would recommend?

2.6 How did you structure your working relationship with the school's administration and staff (e.g., dedicate teams to specific tasks)?

2.7 Did your firm play a primary role (i.e., handling the bulk of the work) or a support/advisory role during EMS development and implementation?

2.8 In cases where consultants play the primary role in managing EMS development and implementation, do you perceive any potential for decreased long-term institutional value at schools (i.e., would schools learn more if they played a more active role)?

2.9 Which aspects of [ ] school's EMS did you manage directly? Which aspects did the school manage?

2.10 Did your firm employ public involvement strategies during EMS development? If yes, describe these strategies.

2.11 How did you resolve concerns (if any) about public involvement during EMS development?

3. Activities and Outcomes

3.1 What were the highest-priority environmental issues at [ ] school?

3.2 Has [ ] school's EMS resulted in short-term changes to environmental management practices?

3.3 Has [ ] school's EMS resulted in long-term changes to environmental management practices?

3.3.1 If no changes yet, is this an explicit objective of your EMS?

3.4 Can you quantify the impact of these changes (short or long-term)?

4. Overall

4.1 How do school EMSs compare with EMSs in industry or government facilities (e.g., in terms of development process, final result, level of external support required, process of building internal support, attention paid to human health and safety issues, level of team participation, barriers to success)?

Appendix C

Sample Issue Prioritization Matrix:
South Portland Memorial Middle School

Memorial Middle School

EHS Impact Worksheet

2003/2004

#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance						Explanation and Notes
				Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	
1	Global	Fire safety	yes	5	5	5	5	4	24	training required
8	Transportation	Fire safety	yes	5	5	5	5	4	24	fire lanes
1	Global	Emergency response/ evacuations	yes	5	5	5	3	5	23	training required
1	Global	General safety	yes	5	5	5	3	4	22	
1	Global	Utilities use	yes	5	5	5	3	4	22	
1	Global	Inputs/consumables	yes	5	5	5	3	4	22	
1	Global	Bulk chemical/fuel storage	yes	5	5	5	3	4	22	yearly inspection
1	Global	Hazardous material/ chemical usage	yes	5	5	5	3	4	22	training required, plan in place
1	Global	Electrical safety	yes	5	5	5	3	4	22	training required
1	Global	Industrial safety	yes	5	5	5	3	4	22	training required
6	Electrical Services	Security	yes	4	5	5	4	4	22	
1	Global	Security	yes	5	5	5	1	5	21	
1	Global	Indoor environmental quality	yes	5	3	5	3	4	20	ventilation system antiquated
1	Global	General solid waste	yes	5	5	5	1	4	20	
1	Global	Biohazards	yes	5	3	5	3	4	20	training required
1	Global	Lead/Asbestos	yes	5	4	5	3	3	20	training required, but can be controlled
6	Electrical Services	Industrial safety	yes	4	4	4	4	4	20	
1	Global	Hazardous or special waste	yes	2	5	5	3	4	19	training required
1	Global	Wastewater	yes	5	1	5	4	4	19	
3	Boiler Rooms	Bulk chemical/fuel storage	yes	5	3	5	4	2	19	underground #2 fuel storage tank
6	Electrical Services	Electrical safety	yes	4	4	4	3	4	19	
12	Classroom	Indoor environmental quality	yes	5	4	4	1	5	19	ventilation, moisture, mold, see NIOSH report
25	Library	Indoor environmental quality	yes	5	5	3	1	5	19	odors, respiratory symtoms, small sorage room See NIOSH report
27	Bathrooms	Indoor environmental quality	yes	5	4	5	1	4	19	poor ventilation, odors, moisture
1	Global	Air pollutant emissions	yes	5	5	5	1	2	18	
8	Transportation	General safety	yes	4	4	4	2	4	18	trip hazzards, walking surfaces, travel lanes
15	Tech. Education	Security	yes	4	3	4	5	2	18	alarmed, outside access
22	Life Skills	General safety	yes	4	4	2	4	4	18	falls, walking surfaces, etc.
22	Life Skills	Fire safety	yes	4	4	4	3	3	18	stoves, W/C
28	Hall Lockers	Security	yes	2	4	4	5	3	18	
1	Global	Pest management	yes	2	3	5	4	3	17	training required
19	Central Receiving	Industrial safety	yes	4	4	2	3	4	17	lifting, ladders, equipment
2	Maintenance shop	Fire safety	yes	5	3	3	2	3	16	flamable storage, lumber, sawdust
10	Nurses/ medical	Indoor environmental quality	yes	5	4	2	2	3	16	ventiilation, thermal conditions, leaking windows, mold present
10	Nurses/ medical	Inputs/consumables	yes	4	3	3	3	3	16	student medications in main office, nurses office and life skills room in locked cabinents
11	Office/Admin. Area	Security	yes	4	3	4	1	4	16	visitor sign in, badges
19	Central Receiving	Indoor environmental quality	yes	4	3	2	3	4	16	vehicle emmisions, VOCs
2	Maintenance shop	General safety	yes	3	4	2	3	3	15	
5	Elevator Mech. Rm	Security	yes	5	2	2	4	2	15	
8	Transportation	Hazardous material/ chemical usage	yes	3	3	4	1	4	15	CaCl on walkways
10	Nurses/ medical	Biohazards	yes	4	3	2	3	3	15	blood borne pathogens
19	Central Receiving	Inputs/consumables	yes	4	2	2	4	3	15	

Memorial Middle School

EHS Impact Worksheet

2003/2004

#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance						Explanation and Notes
				Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	
19	Central Receiving	Bulk chemical/fuel storage	yes	4	3	2	4	2	15	chemical storage
19	Central Receiving	Security	yes	4	3	4	1	3	15	access, visibility
22	Life Skills	Biohazards	yes	4	3	2	3	3	15	bloodborne pathogens, fluids
2	Maintenance shop	Industrial safety	yes	3	3	2	3	3	14	construction activities, safety needs
20	Band Room	Indoor environmental quality	yes	3	4	3	1	3	14	ventilation concerns, re-entrained polutants
26	Teacher's Room	Indoor environmental quality	yes	5	2	3	1	3	14	ventilation
27	Bathrooms	Biohazards	yes	4	3	3	1	3	14	menstral fluids
29	Gym/Locker Rms.	Biohazards	yes	4	3	3	1	3	14	blood borne pathogens
29	Gym/Locker Rms.	Security	yes	2	3	4	1	4	14	gym used for voting
2	Maintenance shop	Indoor environmental quality	yes	3	3	2	3	2	13	ventilation, noise, fumes, odor, dust, Carbon monoxide
2	Maintenance shop	Hazardous material/ chemical usage	yes	5	1	1	3	3	13	Chem. storage (thinner, paint)
3	Boiler Rooms	Air pollutant emissions	yes	4	3	3	1	2	13	exhaust- reintrainment to band room
7	Janitorial	Hazardous material/ chemical usage	yes	4	2	2	3	2	13	chemical storage
19	Central Receiving	Emergency response/ evacuations	yes	1	3	2	4	3	13	chemical spills from barrels
22	Life Skills	Electrical safety	yes	4	2	2	3	2	13	fans, TV, VCR, ground fault protection
22	Life Skills	Industrial safety	yes	4	2	2	2	3	13	hoists, lifting, standing machines (check if equipment regulated?)
22	Life Skills	Emergency response/ evacuations	yes	3	2	2	3	3	13	Student violence, W/C
26	Teacher's Room	Inputs/consumables	yes	4	2	3	1	3	13	food odors
27	Bathrooms	General safety	yes	4	2	3	1	3	13	water and liquid soap on floors
29	Gym/Locker Rms.	Indoor environmental quality	yes	4	2	4	1	2	13	clothing
29	Gym/Locker Rms.	Industrial safety	yes	2	3	2	3	3	13	
3	Boiler Rooms	Hazardous material/ chemical usage	yes	3	3	2	3	1	12	caustic soda flake, sodium nitrate, phosphate
7	Janitorial	Indoor environmental quality	yes	4	2	2	2	2	12	ventilation, dust, odor, allergans, fume control
11	Office/Admin. Area	Indoor environmental quality	yes	4	3	2	1	2	12	copiers in use
12	Classroom	Hazardous material/ chemical usage	yes	4	2	3	1	2	12	white board cleanering fluids, surface cleaners
14	Laboratories	Fire safety	yes	2	3	3	1	3	12	fire blankets, gas shutoffs, fire extinguishers
24	Travel Areas	Indoor environmental quality	yes	4	2	3	1	2	12	tracked in dirt, poor ventilation
25	Library	Inputs/consumables	yes	5	1	3	1	2	12	books, magazines, newspapers
27	Bathrooms	Air pollutant emissions	yes	5	1	3	1	2	12	exhaust fan
28	Hall Lockers	Indoor environmental quality	yes	3	2	4	1	2	12	food and clothing
28	Hall Lockers	General safety	yes	3	2	4	1	2	12	
7	Janitorial	Inputs/consumables	yes	3	2	1	3	2	11	lighting supplies, janitorial supplies
13	Art Room	Indoor environmental quality	yes	3	2	3	1	2	11	art supplies(paints), kiln
20	Band Room	General safety	yes	4	2	3	1	1	11	multilevel platforms
21	Home Ec. Rooms	Inputs/consumables	yes	4	2	3	1	1	11	food preparation and storage
22	Life Skills	General solid waste	yes	4	2	2	1	2	11	regular trash, diapers, medical supplies

Memorial Middle School

EHS Impact Worksheet

2003/2004

#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance						Explanation and Notes
				Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	
23	Multipurpose Room	Indoor environmental quality	yes	4	2	2	1	2	11	photocopiers
29	Gym/Locker Rms.	General safety	yes	2	2	4	1	2	11	easy access to air handlers
13	Art Room	General safety	yes	2	2	3	1	2	10	
13	Art Room	Inputs/consumables	yes	4	1	2	1	2	10	
14	Laboratories	Indoor environmental quality	yes	2	2	3	1	2	10	bunsen burners
15	Tech. Education	Indoor environmental quality	yes	4	1	2	1	2	10	moisture, thermal conditions, ventilation
21	Home Ec. Rooms	General safety	yes	2	2	3	1	2	10	burns, punctures
21	Home Ec. Rooms	Hazardous material/ chemical usage	yes	3	2	3	1	1	10	ammonia products, bleach
22	Life Skills	Inputs/consumables	yes	3	2	2	1	2	10	lifting equipment, furnishings, food, personal care items, donated furnishings
27	Bathrooms	Inputs/consumables	yes	4	1	3	1	1	10	
13	Art Room	Air pollutant emissions	yes	2	2	2	1	2	9	Kiln
21	Home Ec. Rooms	Indoor environmental quality	yes	3	1	3	1	1	9	multiple stoves, water leaks
22	Life Skills	Indoor environmental quality	yes	2	2	2	1	2	9	re-entrained pollutants (fumes from buses, mowing, fertilizer)
23	Multipurpose Room	General safety	yes	2	2	2	1	2	9	stored materials(tables & chairs)
2	Maintenance shop	Inputs/consumables	yes	3	1	2	1	1	8	Tools/building material
21	Home Ec. Rooms	Air pollutant emissions	yes	3	1	2	1	1	8	dryer vent
2	Maintenance shop	Air pollutant emissions	yes	3	1	1	1	1	7	
17	specialty area computer related	Indoor environmental quality	yes	2	1	2	1	1	7	seasonal central air conditioned labs
2	Maintenance shop	Utilities use	global		0	0	0	0	0	
2	Maintenance shop	General solid waste	global	0	0	0	0	0	0	
2	Maintenance shop	Hazardous or special waste	global	0	0	0	0	0	0	
2	Maintenance shop	Wastewater	global	0	0	0	0	0	0	
2	Maintenance shop	Biohazards	no	0	0	0	0	0	0	
2	Maintenance shop	Bulk chemical/fuel storage	global	0	0	0	0	0	0	
2	Maintenance shop	Pest management	global	0	0	0	0	0	0	
2	Maintenance shop	Electrical safety	global	0	0	0	0	0	0	
2	Maintenance shop	Emergency response/ evacuations	global	0	0	0	0	0	0	
2	Maintenance shop	Lead/Asbestos	global	0	0	0	0	0	0	
2	Maintenance shop	Security	global	0	0	0	0	0	0	
3	Boiler Rooms	Indoor environmental quality	no	0	0	0	0	0	0	
3	Boiler Rooms	General safety	global	0	0	0	0	0	0	
3	Boiler Rooms	Utilities use	global	0	0	0	0	0	0	
3	Boiler Rooms	Inputs/consumables	global	0	0	0	0	0	0	
3	Boiler Rooms	General solid waste	no	0	0	0	0	0	0	
3	Boiler Rooms	Hazardous or special waste	no	0	0	0	0	0	0	
3	Boiler Rooms	Wastewater	no	0	0	0	0	0	0	
3	Boiler Rooms	Biohazards	no	0	0	0	0	0	0	
3	Boiler Rooms	Pest management	global	0	0	0	0	0	0	
3	Boiler Rooms	Fire safety	global	0	0	0	0	0	0	
3	Boiler Rooms	Electrical safety	global	0	0	0	0	0	0	
3	Boiler Rooms	Industrial safety	global	0	0	0	0	0	0	
3	Boiler Rooms	Emergency response/ evacuations	global	0	0	0	0	0	0	
3	Boiler Rooms	Lead/Asbestos	global	0	0	0	0	0	0	
3	Boiler Rooms	Security	global	0	0	0	0	0	0	
4	Waste Storage	Indoor environmental quality	global,	0	0	0	0	0	0	Incinerator Room,
4	Waste Storage	General safety	global	0	0	0	0	0	0	

Appendix D

Sample Issue Prioritization Matrix:
Saco's Fairfield School

Fairfield School

EHS Impact Worksheet

2003/2004

#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance						Explanation and Notes
				Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	
3	Boiler Room/Electrical Area	Indoor environmental quality	yes	5	5	5	5	5	25	most of the list
7	Nurses/ medical	Biohazards	yes	4	5	5	4	4	22	entire list
1	Global	Bulk chemical/fuel storage	yes	5	4	4	4	4	21	underground oil tanks, propane
1	Global	Biohazards	yes	5	3	4	4	4	20	entire list, no red bagging of waste
1	Global	Emergency response/ evacuations	yes	4	4	4	4	4	20	
9	Food Service	Inputs/consumables	yes	5	3	4	3	4	19	food storage
1	Global	Electrical safety	yes	2	4	4	4	4	18	general electrical safety concern
1	Global	Lead/Asbestos	yes	5	3	2	4	4	18	mastic holding ceramic tiles, soffet area
1	Global	Fire safety	yes	1	4	4	4	4	17	general fire safety concern
1	Global	Security	yes	1	5	5	1	5	17	intruders
3	Boiler Room/Electrical Area	Bulk chemical/fuel storage	yes	5	4	3	3	2	17	fuel use as well as storage
3	Boiler Room/Electrical Area	Electrical safety	yes	4	5	2	4	2	17	
9	Food Service	Fire safety	yes	4	4	3	3	3	17	separate fire suppression
3	Boiler Room/Electrical Area	General safety	yes	4	3	3	3	3	16	storage
3	Boiler Room/Electrical Area	Air pollutant emissions	yes	5	3	3	3	2	16	
3	Boiler Room/Electrical Area	Industrial safety	yes	3	5	2	4	2	16	lacking lock out/tag out program
9	Food Service	Indoor environmental quality	yes	4	3	3	3	3	16	kitchen exhaust, odor control, CO
9	Food Service	General safety	yes	4	3	3	3	3	16	wet floors, ergonomics, tight corners
1	Global	Industrial safety	yes	3	2	2	4	4	15	roof safety
1	Global	General safety	yes	3	2	3	3	3	14	walking surfaces inside and outside, limited storage space
1	Global	Inputs/consumables	yes	3	2	3	3	3	14	janitorial supplies, furnishings, classroom supplies
1	Global	Wastewater	yes	5	2	2	3	2	14	entire list
1	Global	Indoor environmental quality	yes	4	2	3	1	2	12	water leaks, thermal, dust, diesel exhaust
1	Global	Hazardous or special waste	yes	3	2	2	3	2	12	universal waste
4	Janitorial	General safety	yes	4	2	2	2	2	12	eye wash station, safe storage
4	Janitorial	Hazardous material/ chemical usage	yes	2	4	2	3	1	12	flammables materials storage cabinet
9	Food Service	Wastewater	yes	4	2	2	2	2	12	grease traps
9	Food Service	Pest management	yes	2	2	2	3	3	12	
1	Global	General solid waste	yes	5	1	2	1	2	11	recycling, dumpster location too near building
1	Global	Pest management	yes	2	2	2	3	2	11	ants, IPM plan
10	Travel Areas	Indoor environmental quality	yes	3	2	2	2	2	11	walk off areas, water intrusion
2	Classrooms	Indoor environmental quality	yes	2	2	2	2	2	10	window leak - rooms 1 and 3
2	Classrooms	General safety	yes	2	2	2	2	2	10	storage
2	Classrooms	Inputs/consumables	yes	2	2	2	2	2	10	old furnishings (couches)
6	Grounds	General safety	yes	1	2	2	2	3	10	playground, lighting
1	Global	Utilities use	yes	5	1	1	1	1	9	energy consumption, water use, etc.
1	Global	Air pollutant emissions	yes	2	2	2	1	2	9	boiler exhaust
4	Janitorial	Indoor environmental quality	yes	1	1	1	1	1	5	specific ventilation unit, now controlled
1	Global	Hazardous material/ chemical usage	no						0	
2	Classrooms	Utilities use	global						0	
2	Classrooms	General solid waste	global						0	
2	Classrooms	Hazardous or special waste	global						0	
2	Classrooms	Wastewater	global						0	
2	Classrooms	Biohazards	global						0	
2	Classrooms	Air pollutant emissions	global						0	
2	Classrooms	Bulk chemical/fuel storage	no						0	
2	Classrooms	Hazardous material/ chemical usage	global						0	
2	Classrooms	Pest management	global						0	
2	Classrooms	Fire safety	global						0	
2	Classrooms	Electrical safety	global						0	
2	Classrooms	Industrial safety	global						0	
2	Classrooms	Emergency response/ evacuations	global						0	
2	Classrooms	Lead/Asbestos	global						0	
2	Classrooms	Security	global						0	
3	Boiler Room/Electrical Area	Utilities use	global						0	
3	Boiler Room/Electrical Area	Inputs/consumables	global						0	
3	Boiler Room/Electrical Area	General solid waste	global						0	
3	Boiler Room/Electrical Area	Hazardous or special waste	no						0	

Fairfield School

EHS Impact Worksheet

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#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance						Explanation and Notes
				Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	
3	Boiler Room/Electrical Area	Wastewater	global						0	
3	Boiler Room/Electrical Area	Biohazards	no						0	
3	Boiler Room/Electrical Area	Hazardous material/ chemical usage	no						0	
3	Boiler Room/Electrical Area	Pest management	global						0	
3	Boiler Room/Electrical Area	Fire safety	global						0	
3	Boiler Room/Electrical Area	Emergency response/ evacuations	global						0	
3	Boiler Room/Electrical Area	Lead/Asbestos	no						0	
3	Boiler Room/Electrical Area	Security	global						0	
4	Janitorial	Utilities use	global	0	0	0	0	0	0	
4	Janitorial	Inputs/consumables	global	0	0	0	0	0	0	
4	Janitorial	General solid waste	global	0	0	0	0	0	0	
4	Janitorial	Hazardous or special waste	global	0	0	0	0	0	0	
4	Janitorial	Wastewater	global	0	0	0	0	0	0	
4	Janitorial	Biohazards	no	0	0	0	0	0	0	
4	Janitorial	Air pollutant emissions	global	0	0	0	0	0	0	
4	Janitorial	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
4	Janitorial	Pest management	global	0	0	0	0	0	0	
4	Janitorial	Fire safety	global	0	0	0	0	0	0	
4	Janitorial	Electrical safety	global	0	0	0	0	0	0	
4	Janitorial	Industrial safety	global	0	0	0	0	0	0	
4	Janitorial	Emergency response/ evacuations	global	0	0	0	0	0	0	
4	Janitorial	Lead/Asbestos	no	0	0	0	0	0	0	
4	Janitorial	Security	global	0	0	0	0	0	0	
5	Transportation	Indoor environmental quality	global	0	0	0	0	0	0	
5	Transportation	General safety	global	0	0	0	0	0	0	fire lanes
5	Transportation	Utilities use	no	0	0	0	0	0	0	
5	Transportation	Inputs/consumables	no	0	0	0	0	0	0	
5	Transportation	General solid waste	no	0	0	0	0	0	0	
5	Transportation	Hazardous or special waste	no	0	0	0	0	0	0	
5	Transportation	Wastewater	no	0	0	0	0	0	0	
5	Transportation	Biohazards	global	0	0	0	0	0	0	
5	Transportation	Air pollutant emissions	no	0	0	0	0	0	0	may be covered in a district wide policy
5	Transportation	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
5	Transportation	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
5	Transportation	Pest management	no	0	0	0	0	0	0	
5	Transportation	Fire safety	global	0	0	0	0	0	0	
5	Transportation	Electrical safety	no	0	0	0	0	0	0	
5	Transportation	Industrial safety	no	0	0	0	0	0	0	
5	Transportation	Emergency response/ evacuations	global	0	0	0	0	0	0	
5	Transportation	Lead/Asbestos	no	0	0	0	0	0	0	
5	Transportation	Security	global	0	0	0	0	0	0	
6	Grounds	Indoor environmental quality	global	0	0	0	0	0	0	
6	Grounds	Utilities use	global	0	0	0	0	0	0	
6	Grounds	Inputs/consumables	global	0	0	0	0	0	0	
6	Grounds	General solid waste	global	0	0	0	0	0	0	
6	Grounds	Hazardous or special waste	no	0	0	0	0	0	0	
6	Grounds	Wastewater	global	0	0	0	0	0	0	
6	Grounds	Biohazards	no	0	0	0	0	0	0	
6	Grounds	Air pollutant emissions	no	0	0	0	0	0	0	
6	Grounds	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
6	Grounds	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
6	Grounds	Pest management	global	0	0	0	0	0	0	
6	Grounds	Fire safety	global	0	0	0	0	0	0	
6	Grounds	Electrical safety	global	0	0	0	0	0	0	
6	Grounds	Industrial safety	global	0	0	0	0	0	0	
6	Grounds	Emergency response/ evacuations	global	0	0	0	0	0	0	
6	Grounds	Lead/Asbestos	no	0	0	0	0	0	0	
6	Grounds	Security	global	0	0	0	0	0	0	
7	Nurses/ medical	Indoor environmental quality	global	0	0	0	0	0	0	
7	Nurses/ medical	General safety	global	0	0	0	0	0	0	
7	Nurses/ medical	Utilities use	global	0	0	0	0	0	0	
7	Nurses/ medical	Inputs/consumables	global	0	0	0	0	0	0	
7	Nurses/ medical	General solid waste	global	0	0	0	0	0	0	
7	Nurses/ medical	Hazardous or special waste	global	0	0	0	0	0	0	
7	Nurses/ medical	Wastewater	global	0	0	0	0	0	0	
7	Nurses/ medical	Air pollutant emissions	no	0	0	0	0	0	0	
7	Nurses/ medical	Bulk chemical/fuel storage	no	0	0	0	0	0	0	

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#	Functional Area	EHS Category	Present ?	Assessment of EHS: Impact Significance: Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	Explanation and Notes
7	Nurses/ medical	Hazardous material/ chemical usage	global	0	0	0	0	0	0	
7	Nurses/ medical	Pest management	global	0	0	0	0	0	0	
7	Nurses/ medical	Fire safety	global	0	0	0	0	0	0	
7	Nurses/ medical	Electrical safety	global	0	0	0	0	0	0	
7	Nurses/ medical	Industrial safety	global	0	0	0	0	0	0	
7	Nurses/ medical	Emergency response/ evacuations	global	0	0	0	0	0	0	
7	Nurses/ medical	Lead/Asbestos	no	0	0	0	0	0	0	
7	Nurses/ medical	Security	global	0	0	0	0	0	0	
8	Office/Admin. Area	Indoor environmental quality	global	0	0	0	0	0	0	
8	Office/Admin. Area	General safety	global	0	0	0	0	0	0	
8	Office/Admin. Area	Utilities use	global	0	0	0	0	0	0	
8	Office/Admin. Area	Inputs/consumables	global	0	0	0	0	0	0	
8	Office/Admin. Area	General solid waste	global	0	0	0	0	0	0	
8	Office/Admin. Area	Hazardous or special waste	no	0	0	0	0	0	0	
8	Office/Admin. Area	Wastewater	no	0	0	0	0	0	0	
8	Office/Admin. Area	Biohazards	no	0	0	0	0	0	0	
8	Office/Admin. Area	Air pollutant emissions	no	0	0	0	0	0	0	
8	Office/Admin. Area	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
8	Office/Admin. Area	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
8	Office/Admin. Area	Pest management	global	0	0	0	0	0	0	
8	Office/Admin. Area	Fire safety	global	0	0	0	0	0	0	
8	Office/Admin. Area	Electrical safety	global	0	0	0	0	0	0	
8	Office/Admin. Area	Industrial safety	no	0	0	0	0	0	0	
8	Office/Admin. Area	Emergency response/ evacuations	global	0	0	0	0	0	0	
8	Office/Admin. Area	Lead/Asbestos	no	0	0	0	0	0	0	
8	Office/Admin. Area	Security	global	0	0	0	0	0	0	
9	Food Service	Utilities use	global	0	0	0	0	0	0	
9	Food Service	General solid waste	global	0	0	0	0	0	0	
9	Food Service	Hazardous or special waste	no	0	0	0	0	0	0	
9	Food Service	Biohazards	no	0	0	0	0	0	0	
9	Food Service	Air pollutant emissions	global	0	0	0	0	0	0	
9	Food Service	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
9	Food Service	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
9	Food Service	Electrical safety	global	0	0	0	0	0	0	
9	Food Service	Industrial safety	global	0	0	0	0	0	0	
9	Food Service	Emergency response/ evacuations	global	0	0	0	0	0	0	
9	Food Service	Lead/Asbestos	no	0	0	0	0	0	0	
9	Food Service	Security	global	0	0	0	0	0	0	
10	Travel Areas	General safety	global	0	0	0	0	0	0	
10	Travel Areas	Utilities use	global	0	0	0	0	0	0	
10	Travel Areas	Inputs/consumables	no	0	0	0	0	0	0	
10	Travel Areas	General solid waste	no	0	0	0	0	0	0	
10	Travel Areas	Hazardous or special waste	no	0	0	0	0	0	0	
10	Travel Areas	Wastewater	no	0	0	0	0	0	0	
10	Travel Areas	Biohazards	global	0	0	0	0	0	0	
10	Travel Areas	Air pollutant emissions	global	0	0	0	0	0	0	
10	Travel Areas	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
10	Travel Areas	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
10	Travel Areas	Pest management	global	0	0	0	0	0	0	
10	Travel Areas	Fire safety	global	0	0	0	0	0	0	
10	Travel Areas	Electrical safety	global	0	0	0	0	0	0	
10	Travel Areas	Industrial safety	global	0	0	0	0	0	0	
10	Travel Areas	Emergency response/ evacuations	global	0	0	0	0	0	0	
10	Travel Areas	Lead/Asbestos	global	0	0	0	0	0	0	
10	Travel Areas	Security	global	0	0	0	0	0	0	
11	Teachers' room	Indoor environmental quality	global	0	0	0	0	0	0	
11	Teachers' room	General safety	global	0	0	0	0	0	0	
11	Teachers' room	Utilities use	global	0	0	0	0	0	0	
11	Teachers' room	Inputs/consumables	global	0	0	0	0	0	0	
11	Teachers' room	General solid waste	global	0	0	0	0	0	0	
11	Teachers' room	Hazardous or special waste	no	0	0	0	0	0	0	
11	Teachers' room	Wastewater	global	0	0	0	0	0	0	
11	Teachers' room	Biohazards	global	0	0	0	0	0	0	
11	Teachers' room	Air pollutant emissions	global	0	0	0	0	0	0	
11	Teachers' room	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
11	Teachers' room	Hazardous material/ chemical usage	no	0	0	0	0	0	0	
11	Teachers' room	Pest management	global	0	0	0	0	0	0	
11	Teachers' room	Fire safety	global	0	0	0	0	0	0	
11	Teachers' room	Electrical safety	global	0	0	0	0	0	0	
11	Teachers' room	Industrial safety	global	0	0	0	0	0	0	
11	Teachers' room	Emergency response/ evacuations	global	0	0	0	0	0	0	

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EHS Impact Worksheet

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#	Functional Area	EHS Category	Present ?	Assessment of EHS Impact Significance: Frequency	Severity	Scale	Regulatory Concern	Stakeholder Concern	Total Score	Explanation and Notes
11	Teachers' room	Lead/Asbestos	no	0	0	0	0	0	0	
11	Teachers' room	Security	global	0	0	0	0	0	0	
12	Bathrooms	Indoor environmental quality	global	0	0	0	0	0	0	question of codes and local exhaust venitilation
12	Bathrooms	General safety	global	0	0	0	0	0	0	
12	Bathrooms	Utilities use	global	0	0	0	0	0	0	
12	Bathrooms	Inputs/consumables	no	0	0	0	0	0	0	
12	Bathrooms	General solid waste	global	0	0	0	0	0	0	
12	Bathrooms	Hazardous or special waste	no	0	0	0	0	0	0	
12	Bathrooms	Wastewater	global	0	0	0	0	0	0	
12	Bathrooms	Biohazards	global	0	0	0	0	0	0	
12	Bathrooms	Air pollutant emissions	no	0	0	0	0	0	0	
12	Bathrooms	Bulk chemical/fuel storage	no	0	0	0	0	0	0	
12	Bathrooms	Hazardous material/ chemical usage	global	0	0	0	0	0	0	
12	Bathrooms	Pest management	global	0	0	0	0	0	0	
12	Bathrooms	Fire safety	global	0	0	0	0	0	0	
12	Bathrooms	Electrical safety	global	0	0	0	0	0	0	
12	Bathrooms	Industrial safety	global	0	0	0	0	0	0	
12	Bathrooms	Emergency response/ evacuations	global	0	0	0	0	0	0	
12	Bathrooms	Lead/Asbestos	no	0	0	0	0	0	0	
12	Bathrooms	Security	global	0	0	0	0	0	0	

Appendix E

Schools' Progress Against Performance Measures

Appendix E

SCHOOL PROGRESS AGAINST APPLICABLE PERFORMANCE INDICATORS

Applicable Indicators	Level of Progress
Amherst Middle School	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	School reports that "conversations are taking place that weren't before."
Ability of school staff to articulate EMS goals.	Respondents were able to describe specific EMS goals and procedures.
Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways.	Respondents voiced desire to take more pro-active approach to environmental problem solving.
Expressed self-motivation to continue EMS effort in some form.	Chemical management program will continue; it will take motivated staff to continue and expand EMS once grant funds are exhausted.
Appointment of an EMS Champion.	Named a "project coordinator."
Organization of a core team.	Team includes: project coordinator; town sanitarian; director of town health department; maintenance director at school; on-call technical advisor from UMass Amherst.
Number/diversity of individuals on core team.	Representatives from school and town (see above).
Completed step of identifying and prioritizing environmental issues through a "facility assessment."	Environmental issues prioritized using a matrix approach with core team.
Completed step of assessing legal and regulatory obligations and compliance options.	Completed as part of facility assessment.
Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress.	Environmental policy and performance measures under development.
Presence of training programs for environmental management and environmental issues.	Staff completed DEP training.
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	School contributes in-kind resources (i.e., staff time).
Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)?	EMS will not entail major changes in professional responsibilities. "Same work, different approach."
Presence of a plan to increase solid waste recycling: ♦ Fraction of solid waste recycled (realized or targeted) ♦ Expansion of recycling program to include non-conventional items (e.g., computers, hazardous wastes)	Solid waste is second priority issue (after chemical management); no plan in place or results to date.
Development of energy conservation measures (e.g., motion-sensitive lighting); realized or anticipated energy savings.	Energy conservation is third priority issue (after chemical management and solid waste recycling); no plan in place or results to date.
Modifications in chemical purchasing practices: ♦ Increased quantity of benign/non-toxic chemicals purchased ♦ Reduction in quantity of chemicals purchased/stored on-site	Chemical management is top priority for school. Conducting a chemical clean-out and implementing chemical management system that encompasses both purchasing and storage practices.
In cases where chemical removal has occurred (or is occurring), quantity of chemicals removed.	
Lenox Memorial Middle and High Schools	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	Broad EMS team (including students and cafeteria staff) has helped to increase awareness.
Ability of school staff to articulate EMS goals.	Respondents were able to describe specific EMS goals and procedures.

Appendix E

SCHOOL PROGRESS AGAINST APPLICABLE PERFORMANCE INDICATORS

Applicable Indicators	Level of Progress
Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways.	Respondents value opportunity to take more pro-active approach to environmental problem solving.
Expressed self-motivation to continue EMS effort in some form.	Waste reduction and energy conservation measures will remain in place long after EPA initiative ends.
Appointment of an EMS Champion.	No formal designation. Consultant is *de facto* EMS champion for project.
Organization of a core team.	Team includes: consultant; science teacher; special education teacher; custodial supervisor
Number/diversity of individuals on core team.	Consultant leads team with members fulfilling various functions within school (see above).
Completed step of identifying and prioritizing environmental issues through a "facility assessment."	Core team worked with superintendent and principal to prioritize issues.
Number of functional areas identified in facility assessment.	Beginning within functional areas related to energy conservation and waste reduction.
Completed step of assessing legal and regulatory obligations and compliance options.	Completed as part of facility assessment.
Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress.	Environmental policy and performance measures under development.
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	Schools contribute in-kind resources (i.e., staff time).
Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)?	Increases in staff responsibility. Head custodian claims EMS has "complicated" his job.
Presence of a plan to increase solid waste recycling: ♦ Fraction of solid waste recycled (realized or targeted) ♦ Expansion of recycling program to include non-conventional items (e.g., computers, hazardous wastes)	Initial solid waste recycling efforts have yielded results: ♦ Divert four cubic yards of sawdust per week to local farmer for animal bedding. ♦ Conserve six 800' rolls of paper towels per week by instead using cloth towels recycled from local resort.
Development of energy conservation measures (e.g., motion-sensitive lighting); realized or anticipated energy savings	School took energy baseline and is retrofitting lighting fixtures in priority areas (e.g., gymnasium); no results to date.
Modifications in chemical purchasing practices: ♦ Increased quantity of benign/non-toxic chemicals purchased ♦ Reduction in quantity of chemicals purchased/stored on-site	School is implementing a smart purchasing program for chemicals.
Newton Public Schools	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	School reports efforts to instill in staff the responsibility for maintaining a healthy school environment (e.g., teachers responsible for their classrooms). EMS training has been conducted in all schools.
Ability of school staff to articulate EMS goals.	Respondents were able to describe specific EMS goals and procedures.
Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways.	Respondents value opportunity to take more pro-active approach to environmental problem solving.
Expressed self-motivation to continue EMS effort in some form.	School EMSs will continue after pilot ends. In addition, department of public buildings is transferring EMS components to other city properties (e.g., IPM at police station).
Appointment of an EMS Champion.	Named a "project coordinator."

Appendix E

SCHOOL PROGRESS AGAINST APPLICABLE PERFORMANCE INDICATORS

Applicable Indicators	Level of Progress
Organization of a core team.	Team includes: consultant; project coordinator; school personnel (e.g., human resources, representatives from custodial and teachers' unions); officials from various city departments (e.g., health, public buildings, fire, public works).
Number/diversity of individuals on core team.	Broad team representing various functions within school and city (see above).
Completed step of identifying and prioritizing environmental issues through a "facility assessment."	Informal assessment; addressing most pressing issues first.
Completed step of assessing legal and regulatory obligations and compliance options.	Completed as part of facility assessment.
Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress.	Environmental policy and performance measures under development.
Presence of training programs for environmental management and environmental issues.	Training has taken place at all schools.
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	Schools contribute in-kind resources (i.e., staff time).
Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)?	EMS adds substantial commitments onto existing responsibilities. Most notably, "project coordination" devotes 25 percent of time to EMS project.
Does the EMS include pre-emptive strategies to address environmental concerns before they become environmental crises?	Adopted "bottom up" approach of having teachers responsible for taking proactive steps to recognize and prevent hazards in their classrooms.
Presence of a plan to increase solid waste recycling: ♦ Fraction of solid waste recycled (realized or targeted) ♦ Expansion of recycling program to include non-conventional items (e.g., computers, hazardous wastes)	Solid waste is among priority short-term issues; no plan in place or results to date.
Development of energy conservation measures (e.g., motion-sensitive lighting); realized or anticipated energy savings	Energy conservation measures "on the horizon."
Development of protocols for addressing indoor air quality concerns; measurable improvements in indoor air quality.	Top priority for school system; plans under development but no results to date.
Modifications in chemical purchasing practices: ♦ Increased quantity of benign/non-toxic chemicals purchased ♦ Reduction in quantity of chemicals purchased/stored on-site	Schools are implementing smart purchasing program for chemicals and improving chemical management practices.
Improved management of pesticides and fertilizers ♦ Presence of an Integrated Pest Management (IPM) plan for pesticide application ♦ Annual reduction in pesticide/fertilizer use	IPM practices at schools are being transferred to other municipal buildings (e.g., police department).
Development of water conservation strategies (e.g., low-flush toilets); realized or anticipated water use reduction	Water conservation measures "on the horizon."
Saco's Fairfield School	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	School reports initial increases in environmental awareness among staff .
Ability of school staff to articulate EMS goals.	Respondents were able to describe specific EMS goals and procedures.
Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways.	Respondents value opportunity to take more pro-active approach to environmental problem solving.

Appendix E

SCHOOL PROGRESS AGAINST APPLICABLE PERFORMANCE INDICATORS

Applicable Indicators	Level of Progress
Expressed self-motivation to continue EMS effort in some form.	School very early in EMS; foresees continuing EMS indefinitely.
Appointment of an EMS Champion.	No formal designation. Superintendent and school principal are *de facto* EMS champions for project.
Organization of a core team.	Team includes: ALA-ME representative; superintendent; principal; custodian; nurse; teacher; maintenance director.
Number/diversity of individuals on core team.	ALA-ME advises team with members fulfilling various functions within school (see above).
Completed step of identifying and prioritizing environmental issues through a "baseline analysis."	School very early in EMS; prioritization impending.
Completed step of assessing legal and regulatory obligations and compliance options.	Will complete as part of baseline analysis.
Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress.	Environmental policy and performance measures under development.
Presence of training programs for environmental management and environmental issues.	Training upcoming as EMS develops.
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	School contributes in-kind resources (i.e., staff time).
Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)?	School foresees few EMS-related changes in professional responsibility.
Development of protocols for addressing indoor air quality concerns; measurable improvements in indoor air quality.	Top priority for school (another Saco school closed because of IAQ issues); plans under development but no results to date.
Modifications in chemical purchasing practices: ♦ Increased quantity of benign/non-toxic chemicals purchased ♦ Reduction in quantity of chemicals purchased/stored on-site	Will be among high-priority issues; no plans in place yet.
South Portland Memorial Middle School	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	School reports improved staff awareness on environmental issues (e.g., through training on "how building works").
Ability of school staff to articulate EMS goals.	Respondents were able to describe specific EMS goals and procedures.
Ability of participants to articulate value of looking at conventional issues in non-traditional, non-compartmentalized ways.	Respondents value opportunity to take more pro-active approach to environmental problem solving.
Expressed self-motivation to continue EMS effort in some form.	Respondents plan to continue EMS; feel that long-term effects will be "huge."
Appointment of an EMS Champion.	No formal designation. Facilities manager and assistant principal are *de facto* EMS champions for project.
Organization of a core team.	Team includes: ALA-ME representative; consultant; assistant principal; maintenance director; nurse; grade teacher; art teacher; head custodian.
Number/diversity of individuals on core team.	ALA-ME and consultant advise team with members fulfilling various functions within school (see above).
Completed step of identifying and prioritizing environmental issues through a "baseline analysis."	Environmental issues prioritized using a matrix approach with core team.
Number of functional areas identified in baseline analysis.	Assessment resulted in 23 high-priority functional areas; team awaits NIOSH report before "prioritizing the priority items."
Completed step of assessing legal and regulatory obligations and compliance options.	Completed as part of baseline analysis.

Appendix E

SCHOOL PROGRESS AGAINST APPLICABLE PERFORMANCE INDICATORS

Applicable Indicators	Level of Progress
Completion of an official Environmental Policy, including: EMS implementation responsibilities; dedication of resources for future implementation stages; and performance indicators to assess progress.	Environmental policy under development. Performance measurement system (being developed in a separate ALA-ME project) will track sick days, staff concerns, building maintenance.
Presence of training programs for environmental management and environmental issues.	School training teachers on "how building works" (e.g., why resting books on ventilator diminishes air flow).
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	School contributes in-kind resources (i.e., staff time).
Does the EMS include explicit assignment of responsibility for key functions (e.g., chemical storage, handling, and disposal)?	School acknowledges changes to professional responsibilities across functional areas.
Does the EMS include pre-emptive strategies to address environmental concerns before they become environmental crises?	Proactive approach will diminish future problems and provide "planned reactions" to problems that do arise.
Development of protocols for addressing indoor air quality concerns; measurable improvements in indoor air quality.	EMS walk-through yielded several IAQ-related budget recommendations: (1) Raise chimney near air intakes; (2) caulk windows with moisture problems; and (3) replace worn asbestos tiles in center stairs.
Increased communication in the community with respect to environmental concerns (e.g., improved coordination with fire department on safety issues).	Community outreach plan includes a monthly newsletter and a webpage (under development).
Development of maintenance protocols (e.g., filter replacement, vent maintenance) to prevent and mitigate mold.	Performance indicators will indicate maintenance frequencies for school equipment.
Improved management of pesticides and fertilizers ♦ Presence of an Integrated Pest Management (IPM) plan for pesticide application ♦ Annual reduction in pesticide/fertilizer use	School envisions pesticide management and fertilizer reduction as being high-priority issues within EMS.
Identification and management of asbestos insulation; quantity of removals.	School plans to replace worn asbestos tiles.
Wiscasset Middle School	
Increased awareness of environmental issues among teachers, facilities staff, and administrators.	School completed EMS training in spring 2003.
Completed step of identifying and prioritizing environmental issues through a "baseline analysis."	Prioritization in progress; school lost key staff and effort seems to have gone inactive.
School funds committed to EMS effort (complement/supplement to pilot program funding); in-kind resources committed by school (e.g., staff hours).	School contributes in-kind resources (i.e., staff time).