



Building Successful Programs to Address Chemical Risks in Schools:

Recommendations from an Evaluation of Selected Schools Chemical Management Programs



Acknowledgements

This report is part of an evaluation that was primarily performed by Indtai, Inc. State, tribal and local school chemical management program implementers, and EPA personnel in the program offices and each of the ten EPA Regions, contributed to the preparation of the publication through survey responses, comments and editorial review.

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The Formative Evaluation – The Foundation of this Document



In 2005, EPA commissioned an evaluation of a number of school chemical management programs. The information from this evaluation was used in developing the national Schools Chemical Cleanout Campaign (SC3). Some of the programs that were evaluated were initiated and funded by state and local entities, while the federal EPA funded others. This type of evaluation tool, known as a Formative Evaluation, was used to assess activities undertaken in these programs to furnish information that will guide program improvement for new and existing programs.

Specifically, the Formative Evaluation was used to gain insights into the structure, processes, operations, stakeholders, and implementers involved in school chemical management programs.

The analyses relied on document reviews and dynamic interviews¹ of responsible chemical management program implementers at the federal, state, and local levels. Interviewees provided accounts of their programs from creation, through implementation, to the institutionalization of sustainable, preventative chemical management policy.

Based on these activities, critical success and barrier factors, best management practices, and recommendations were developed. In February 2006 EPA was presented with a final report on the Formative Evaluation, which serves as the backbone for this document. The final report has been restructured to be more useful to our intended school audience, while maintaining the independent quality and substance of the evaluation.

Please refer to the appendices for the detailed discussion of the methodology, summaries of the programs that were examined, and interview questions that were part of the Formative Evaluation.

¹ A “dynamic” interview process tailors the list and order of questions asked based on the role, knowledge, and experience of an interviewee. This ensures that appropriate questions are asked as not all interviewees have knowledge of all informational objectives associated with the project.

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Executive Summary

Across the country, unneeded, excessive, or dangerously mismanaged chemicals are often found in K-12 schools. Accidental spills involving these chemicals:

- ❖ Endanger students and staff;
- ❖ Result in school days lost;
- ❖ Cost millions of dollars to clean up each year; and
- ❖ Are preventable, in many instances.

Dangerously mismanaged chemicals represent one of the critical environmental health and safety issues schools must address to improve the learning environment for children and to provide a

healthy workplace for teachers and staff. Several widely publicized incidents involving chemicals have resulted in school closures and costly cleanups. As a result, the states and EPA investigated the problem and found that a large majority of middle and high schools have unneeded, excessive, or mismanaged chemicals, potentially putting students and staff at risk.

Schools need sustainable solutions for managing the chemicals in their facilities...

- ❖ Cleaning up chemical spills is more costly than removing chemicals from schools and implementing preventive measures.
- ❖ Cleaning up chemical spills cost schools, school districts, and communities millions of dollars.
- ❖ Removal costs vary, averaging between \$2,000 and \$5,000, unless there are radioactive or explosive chemicals, which increase the removal costs substantially.

This report:

- ❖ Describes the problem caused by unneeded, excessive, or dangerously mismanaged chemicals in K-12 schools;
- ❖ Recommends ways to address the problem; and,
- ❖ Provides "lessons learned" from state and local chemical management programs to address chemical mismanagement in schools.

In 2004, using various state and local programs as models, EPA launched the Schools Chemical Cleanout Campaign (SC3). The campaign uses a variety of innovative approaches to achieve its three goals:

- ❖ Remove accumulations of potentially dangerous chemicals from K-12 schools;
- ❖ Prevent future accumulations through improved chemical management; and
- ❖ Raise national awareness of the issue.

As mentioned earlier in this document, in 2005, EPA commissioned a Formative Evaluation to study a number of responsible chemical management programs across the country in order to learn why some of these programs were successful and what problems were encountered during program development and implementation. The checklist of recommendations we present in this document is based on lessons learned, best practices, and the informed opinions of interviewees. The recommendations are useful to those seeking to establish new SC3 programs. They can be used to improve and increase participation in existing responsible chemical management programs by reducing barriers, easing implementation, and

leveraging existing resources and relationships. Each of these recommendations is fully explained later in this document. Please remember it is not necessary to tackle all items on the checklist at one time to have a successful SC3 effort; you can improve chemical management in your school by accomplishing any of the following actions:

- ☑ Assess chemical management concerns to identify program objectives.
- ☑ Develop a clear and comprehensive program message.
- ☑ Involve community stakeholders and form partnerships.
- ☑ Gain senior management support for SC3 programs.
- ☑ Measure achievements and identify improvements.
- ☑ Identify and leverage existing outreach and communication mechanisms.
- ☑ Provide focused training to teachers, facilities, and administrative personnel.
- ☑ Incorporate chemical management into every day classroom activities, business practices, and budget development.
- ☑ Obtain technical assistance to support all phases of your SC3 program.
- ☑ Develop incentives and strategies to overcome potential program participation hurdles.

In the section of this document entitled “Practical Considerations and Advice from Interviewees,” we discuss the findings upon which these recommendations are based.

Conclusion

Approaches for developing SC3 programs must be flexible and allow for adding components in phases when resources and conditions are right for your school. While each school has its own set of unique circumstances, the need for responsible chemical management practices that ensure schools are safe from chemical risks is common among all. The experiences and practical knowledge presented in this report are intended help you prevent chemical mismanagement in schools, thereby protecting children, teachers, staff and the environment.

Introduction

Inappropriate and mismanaged chemicals can be found in several locations in a school, not just the chemistry laboratory.

Unneeded, excessive, or dangerously mismanaged chemicals are often found in K-12 schools across the nation, potentially putting students and staff at risk. Thus, mismanaged chemicals represent one of the critical environmental health and safety issues schools must address.

The Schools Chemical Cleanout Campaign (SC3) promotes the removal of unneeded, excessive, or dangerously mismanaged chemicals from K-12 schools. SC3 programs also promote the creation of policies that prevent future unnecessary accumulations of chemicals and of practices that sustain responsible management of necessary chemicals. These programs are designed to decrease the risk of exposure, thus improving the learning environment and reducing lost school days.

Many different types of programs exist across the country to address this issue. In this document you will learn about existing chemical management programs that have been implemented to improve the learning environment for children and to provide a healthy workplace for teachers and staff. You will learn about factors that contributed to the success of these programs, barriers that had to be overcome, as well as the major recommendations drawn from the experiences of the program implementers themselves.



*Newspaper article about a school chemical spill.
Photo courtesy of Tennessee Department of Environment
and Conservation*

Overview of the Problem

When handled responsibly, chemicals are useful educational tools. They allow students to conduct experiments in the lab, create works of art in the studio, and restore vehicles in the automotive shop. When they are mismanaged, however, chemicals can pose risks to students and staff. Examples of potential chemical hazards are in the table below. More information can be found on the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards on the Web at: <http://www.cdc.gov/niosh/npg/>.

Location	Product Type	Hazardous Ingredient Examples
	Acids (undiluted)	hydrochloric acid nitric acid
	Bases (undiluted)	sodium hydroxide
	Solvents	methanol methylene chloride
	Oxidizers	lead nitrate
	Compressed gases	oxygen
	Toxins	cyanides chromates mercury salts
Vocational and Trade Shops	Solvents (used in paints, paint thinners, adhesives, lacquers, primers, and other products)	petroleum naphtha turpentine
	Cleaning supplies, detergents	phosphoric acid sodium silicate
	Compressed gases	acetylene nitrogen
	Fuels, transmission, and brake fluids	gasoline
Visual and performing art studios	Solvents (used in paints, paint thinners, adhesives, lacquers, primers, and other products)	mineral spirits
	Pottery clear coating glaze	lead
	Pigments for paints and coatings	cadmium manganese chromium
	Acids for etching	nitric acid hydrochloric acid
	Dry clay for ceramics and jewelry	silica
Custodial/Maintenance Areas	Cleaning supplies/detergents	butoxy ethanol trisodium phosphate

	Drain cleaners (alkaline)	potassium hydroxide
	Drain cleaners (acidic)	sulfuric acid
	Pesticides (including disinfectants/sterilizers)	permethrin sodium hypochlorite
	Paint thinners	toluene
	Solvents (used in paints, paint thinners, adhesives, lacquers, primers, and other products)	xylene
Swimming Pools	Water treatment chemicals	"chlorine tablets"
Kitchens/Cafeterias	Pesticides (including disinfectants/sterilizers)	sodium hypochlorite
	Cleaning supplies/detergents	ammonium hydroxide
	Refrigerants	freon ammonia
Nurses' Offices	Medical equipment	mercury (thermometers and blood pressure manometers)
Photography Laboratories	Intensifiers/reducers	potassium dichromate hydrochloric acid
	Developers	hydroquinone
	Stop baths and fixer	acetic acid
School Grounds/ Athletic Fields	Pesticides	2, 4-D
	Fertilizers	ammonium nitrate
Administrative Offices	Correction fluid	ethylene glycol trichloroethane
	Solvents (used in paints, paint thinners, adhesives, lacquers, primers, and other products)	methyl ethyl ketone petroleum distillates
	Printer/copier toners	carbon black

Schools are primarily managed at the local level, where they receive funding, operate, and set priorities. Each school district has its own priorities, standard operating procedures, and challenges. Therefore, schools and school districts must balance competing priorities and budget constraints. Environmental health and safety issues—such as responsible chemical management—are one of the many components that must be considered to provide children with a safe environment that promotes education and development. For more information on healthy school environments, please go to <http://www.epa.gov/schools>.

The next chapter presents a checklist of recommendations for building a successful program. This checklist is based on the section of this document entitled "Practical Considerations and Advice from Interviewees," which will provide a wealth of information you can use in developing or improving your SC3 program.

Checklist for Building a Successful SC3 Program

This section provides a checklist of recommendations for building a successful SC3 program, which will help you make responsible chemical management in your school or school district. You can design and implement your SC3 program one item at a time, as resources become available. Accomplishing even one of the recommendations likely will improve chemical management in your school.



Assess chemical management concerns to identify program objectives.

Assessing how chemicals are managed in your school will help you identify the necessary components of a responsible chemical management program and help you plan and budget accordingly. This exercise can also be a good tool to identify areas that will require expertise from potential program partners at the federal, state, tribal, or local community levels. Typical scoping questions might include:

- ❖ How many and what type of schools (e.g., high school, vocational, private) are involved?
- ❖ How many children are impacted?
- ❖ How many faculty and facility staff persons are impacted?
- ❖ Have there been chemical emergencies at any of the schools?
- ❖ What chemicals were involved and in what amount?
- ❖ What chemicals are currently in the school, in what location, condition and quantity, and for what purpose?
- ❖ Are there any “high risk” situations requiring immediate attention?
- ❖ Are there any existing regulations that govern chemical management and safety?

Answering these questions will help you determine what steps you need to take and how much it will cost to address your chemical management problems. Initially, SC3 programs may not have adequate funds to tackle all of the schools' chemical management needs but the school may be able to carve out an aspect of the program with which to start. At this stage, it is important that, at a minimum, administrators consider chemical management among the top priorities. As the program develops and partnerships are established, funds or services may become available to expand the program.



Develop a clear and comprehensive program message.

Developing a clear message should be one of the first steps in developing an SC3 program. It will help you set the tone for the program, develop measurable goals and objectives, and ensure that all participants are on the same page.



Involve community stakeholders and form partnerships.

Having an appropriate mix of partners who can offer technical expertise and financial resources throughout the SC3 program can help create a robust program that offers a variety of benefits to schools. State, tribal, and local agencies often have a direct impact on schools. Non-governmental bodies also may influence school-level decisions including school and teacher accreditation organizations; associations representing teachers, school administrators, facilities personnel, and school purchasing officials; parent/teacher organizations; local emergency planning committees; unions; non-profit organizations; and community leaders. Other partners that may interact with schools are manufacturers; chemical suppliers; insurance companies; colleges and universities; waste management and environmental services firms; local businesses; and, state and federal agencies. These organizations can contribute support for SC3 programs and help champion and promote the cause to attract additional partners.



Gain senior management support for SC3 programs.

Gaining senior management support raises the level of priority for SC3 programs and mitigates resistance to change. This high-level support can also be useful as you seek funding and dedicated staff for SC3 activities. Informing senior management of the program's short- and long-term goals, partner roles and responsibilities, and achievements are just a few of the approaches to increasing management support.



Measure achievements and identify improvements.

SC3 programs should set performance goals or targets, and develop performance metrics for which data can be cost-effectively collected. All programs need a way to measure accomplishments and improvements and identify program deficiencies and corrective measures. Metrics can also be a useful tool for schools in designing effective chemical management practices; meeting larger school or community environmental goals; budgeting; and supporting funding decisions. Typical SC3 metrics may include: quantity of chemicals removed, number of personnel trained, and number of student and staff affected. It is also important to gauge the effectiveness of program components aimed at changing behavior, such as assessing whether chemical management training improves teachers' knowledge and performance of chemical safety in the classroom.



Identify and leverage existing outreach and communications mechanisms.

A wealth of outreach and communication avenues already exist that can be used to generate interest in SC3 programs. Piggybacking on existing events for teachers, administrators, and facility personnel ensures a captive audience and leverages limited financial resources. It also eases scheduling difficulties and allows school personnel to participate without interfering with their personal time and resources.

Outreach and communication opportunities...

- ❖ Teacher in-service days and staff meetings;
- ❖ College-level seminars;
- ❖ Industry conferences;
- ❖ Existing training opportunities for teachers, facilities/maintenance, and administrative staff;
- ❖ Newsletters and relevant publications;
- ❖ Online resources such as listservs; and
- ❖ Partner mailing or distribution lists.



Provide focused training to teachers, facilities, and administrative personnel.

In the majority of cases, adequate training about responsible chemical management is not part of the college curriculum for teachers. Therefore, it is important to provide practical information so that teachers can help implement responsible chemical management activities such as taking inventory of chemicals, assisting with chemical cleanouts, and instituting responsible chemical management practices. Offering training opportunities at little or no cost to teachers acts as an incentive for participation. Various entities, such as technical experts or community partners, could share the responsibility of developing or providing training. Program implementers should also remember that facilities personnel at the school district or individual school level are often knowledgeable about chemical handling and storage, regulations, and ordering practices. Whenever possible, facilities personnel should be engaged to provide assistance with developing, understanding, and implementing chemical management policies and practices.

Training will allow relevant school staff to:

- ❖ Prepare chemical inventories;
- ❖ Arrange for cleanouts;
- ❖ Identify hazards; and
- ❖ Institute responsible chemical management practices.



Incorporate responsible chemical management into classroom activities, business practices, and budget development.

To prevent the need for future cleanouts, it is essential that responsible chemical management practices be incorporated into a school's approach to providing a safe learning environment. Disposing of unneeded, outdated, and excessive chemicals is critical to creating safe schools and an important step in achieving proper chemical management. It is essential that schools develop and implement responsible chemical management and waste minimization practices to decrease the risk of accidents and exposures and the need for cleaning out future chemical accumulations.

Examples of responsible chemical management practices...

- ❖ Purchasing policies;
- ❖ Chemical inventory management;
- ❖ Small scale chemistry;
- ❖ Disposal;
- ❖ Chemical inventory control/procedures;
- ❖ Proper chemical storage;
- ❖ Routine training of relevant school personnel about chemical management; and
- ❖ Budgeting to support these activities.



Obtain technical assistance to support all phases of your SC3 program.

Technical resources might include...

- ❖ A website with critical SC3 information or web links;
- ❖ Guidance or "how to" materials;
- ❖ A technical assistance center or hotline; or
- ❖ SC3 program partners.

Looking for opportunities to obtain easily accessible technical assistance resources that provide help and advice to program implementers in the near term and throughout the chemical management lifecycle is an important part of an SC3 program. SC3 program implementers can consider using available technical resources that have been developed by other SC3 programs. If that is not feasible, SC3 program implementers should develop technical assistance resources to meet your school's needs.



Develop incentives and strategies to overcome potential program participation hurdles.

The use of incentives is a powerful tool. Discounts on insurance rates, public acknowledgement of SC3 program success, and other forms of recognition can motivate a school and other partners to participate in an SC3 program. Realistically, however, your SC3 program may encounter hurdles from a variety of sources. Being aware of potential hurdles can help you strategize how to overcome them when they arise.



Putting Recommendations into Practice.

Considering the above recommendations as you develop, implement, or improve your SC3 program will help to create a robust, self-sustaining program with measurable results. The following section of this report will provide you with practical considerations and advice from program implementers to support putting the recommendations into practice.

Practical Considerations and Advice from Interviews

The checklist of recommendations in the previous section was developed from the experiences of those who have designed and implemented chemical management programs at the state and local school and district level.² In this section you will find practical considerations and advice from first-hand experiences of SC3 program implementers across the country. What follows are real examples from program implementers of critical success factors; barriers to successful programs; tips to ensure results; and, methods to sustain SC3 programs that achieve long-term responsible chemical management.

A. Creating Successful SC3 Programs

Many factors are critical to the success of SC3 programs.

The “Message” Is Important

- **Develop a clear message.** To catch or hold the school’s attention, develop a clear message about chemical cleanout activities and responsible chemical management practices. Make sure it is concise and easily understood. However, it is important to remember that while a state, tribal, or local SC3 program may have a clear message, if school administrators do not believe their school has a chemical management problem or that it is a priority, then the message will be lost. Messages such as “Mismanagement of Chemicals Puts Students at Risk” sometimes prove to be useful. This message was used in public service announcements that were placed by EPA into trade magazines. In many SC3 programs, including King County, Washington’s “Rehab the Lab” program, implementers use pictures of poor chemical management from local schools to illustrate the problems that result if chemicals are not removed or properly stored. The use of visual images and personal stories are often effective ways to illustrate the magnitude of the problem and enhance the message.
- **Determine who should deliver the message.** It is important to identify who will be most effective in delivering the message. Some schools tend to pay more attention to a message coming from a state Department of Education than from an environmental agency, because they believe that they are more accountable to an education agency. Furthermore, schools may perceive a message coming from an environmental agency as an enforcement threat. If this happens, the school may be disinclined to admit the presence of chemical hazards in their school due to concern about a penalty. In this case, a program message should clearly state that the SC3 program is not an enforcement program.
- **Provide program details up front.** Providing details on the program’s requirements, level of implementation effort, and benefits may increase participation by removing or mitigating preconceived barriers. For example, a school may assume participation will require a large amount of staff time and resources when, in fact, these are obstacles that can be overcome by forming partnerships with the community or industry. In at least one instance, providing more information up-

² The facts and opinions expressed during the interview process of the evaluation served as the primary source of information for answering the main questions of the evaluation project and are the basis for this section of the report.

front increased the number of schools interested in participation because they were aware of the expectations and “knew what they were getting themselves into.”

Enlist Participation

- **Secure school participation.** By instituting requirements or prerequisites for participation, the SC3 program implementer can measure the degree of adherence to responsible chemical management practices. In Tennessee, Maine, and Vermont, program implementers used written participation agreements that each school signed. In the “Rehab the Lab” program in King County, Washington, a small fee was imposed to get potential participants “invested” in the program. In Vermont’s “School Science Lab and Mercury Clean-Out Project” and Ohio’s “Hazardous Waste Removal Program,” teachers were required to attend training sessions to fulfill SC3 program requirements.
- **Leverage available resources and knowledge holders.** A comprehensive SC3 program requires expertise not only in environmental issues, but also in school management and administration; education and curriculum development; chemical management safety and training; health concerns; regulatory requirements; and risk management. It is not economical or practical for one entity to have resources to meet all of the various program requirements. Therefore, it is essential that the state, tribe or local SC3 program implementers call upon available resources and expertise housed in other agencies, industry, and the community.

Form Partnerships

- **Form partnerships.** Form and use effective partnerships to gain specialized knowledge, resources, and staff. Some factors that affect the ultimate effectiveness of these partnerships are:
 - ❖ Definition and delineation of roles and responsibilities;
 - ❖ Open lines of communication; and
 - ❖ Agreement on time and resource commitments.



It will be necessary to perform an initial assessment of partner interest. The SC3 program implementer should engage potential partners early in the SC3 scoping process to gauge the level of interest and determine the resources they are willing to contribute to the program. This up-front assessment will decrease the risk of seeming to have a lot of partners when only a few actually contribute to the program. The key is to choose a range of partners who will remain active and provide assistance throughout the life of the SC3 program.

Also, it will be necessary to define roles and responsibilities. Once partners are identified, their respective roles and responsibilities need to be defined. This can be done by the SC3 lead organization or collaboratively with the partners. Defining roles is essential to a productive and responsive partnership that takes advantage

of organizations' specialized expertise while establishing involvement expectations. Below is a list of potential partners and what they may contribute.

❖ **Chemical Suppliers and Manufacturers**

- Provide technical assistance to schools on how to inventory their chemicals, manage and dispose chemicals responsibly;
- Offer cost-effective waste analysis and handling solutions for periodic cleanouts;
- Assist schools in establishing best practices and developing a chemical management plan;
- Offer training and workshops to teachers and facilities personnel; and
- Promote product stewardship through full service chemical management.

❖ **Waste Handlers and Environmental Services Providers**

- Assist with the management of waste chemicals and encourage schools to keep different types of waste separate at the point of generation;
- Help schools set up a secure and segregated hazardous waste storage area that is clearly marked if hazardous waste is stored on-site before it is disposed;
- Offer cost-effective waste analysis and handling solutions; and
- Provide schools with waste manifests and accurate records of the final disposition of their wastes.

❖ **Fire, Police, and Emergency Response**

- Establish effective communication with the schools or school districts in your community;
- Provide schools/school districts with information on fire codes and identifying applicable requirements regarding chemical use, storage, and disposal. This information could be conveyed through periodic walkthroughs;
- Offer training or guidance on responsible chemical management;
- Work with schools to identify potentially harmful and dangerous situations related to the use and storage of chemicals;
- Assist with the handling of dangerous chemicals; and
- Help develop school-specific chemical management and emergency response plans.



❖ **Colleges and Universities**

- Share expertise of environmental health and safety staff with area K-12 schools and help assess chemical cleanout, management, and disposal issues, such as:
 - Conducting a chemical inventory;
 - Offer courses and training in environmental health and safety for teachers and school district employees;
 - Consider offering opportunities to local schools to share in the college or university's waste collection and disposal system;
 - Incorporate environmental health and chemical safety training into the curriculum of pre-service teachers; and
 - Encourage teachers to evaluate the chemicals they use in their lessons and recommend the use of less toxic alternatives or lessons that create less chemical waste.

❖ **Environment, Health, and Education Agencies**

- Provide technical assistance to schools in conducting chemical inventories and cleanouts;
- Allow schools to dispose of some of their chemicals in household hazardous waste collections, if feasible; and
- Assist schools with funding chemical management programs.

When considering potential partners, explore existing and natural relationships to schools. A low cost, high return investment for SC3 program developers is to make good use of existing relationships with schools. Entities with an existing relationship with schools are often natural partners for SC3 efforts. They already have knowledge, personnel, and other resources dedicated to providing services to schools. In Rhode Island's "Chemical Safe Schools Committee," personnel at the Rhode Island Department of Health used existing relationships with personnel at the state environmental agency, local college and university, and others to gain support of SC3 efforts. In addition, SC3 programs can take advantage of existing infrastructure that can be used for communication, outreach, training, and other activities. The Tennessee Department of Environment and Conservation (TDEC) use an existing pollution prevention program's infrastructure (Tennessee Pollution Prevention Partnership) to secure state agency and business partners for their SC3 program. Also remember that personnel overseeing the facilities and grounds and others, such as the school nurse, often know a lot about chemical handling, storage, and ordering practices. Whenever possible, these personnel should be engaged to provide assistance with chemical management policies and practices.

And finally, do not forget to involve the local community. Local community partners extend past parents and teachers to include local fire departments; emergency personnel; local businesses; colleges and universities; municipal solid waste districts and others. These groups strive to provide services to the local community and may have children in schools, making the incentive to help even

greater. You should consider what a resource they can be to help with outreach, technical assistance, program implementation and sustainability.

Plan for Full Chemical Lifecycle Implementation

- **Inventory existing chemical supplies.** Completing a chemical inventory not only provides schools with a baseline characterization of the situation, but also serves as a tool for future chemical management. Knowing the amounts and types of chemicals is also useful when estimating removal and disposal costs.



A chemical storage area in a Tennessee school that was inventoried as part of TDEC's SC3 efforts. Photo courtesy of TDEC.

Another type of inventory is an actual on-site audit. These audits not only inventory chemicals for disposal, but also allow trained staff to educate teachers and other relevant school staff on storage practices and related safety issues. In Oshkosh, Wisconsin on-site audits showed that more than double the amount of chemicals were removed from schools than had been originally stated on the inventory sheet completed by teachers before the audit.

- **Include responsible chemical management and chemical cleanout as program elements.** Disposing of inappropriate and dangerous chemicals is critical to creating safe schools; what is equally important is to institute responsible chemical management practices. Responsible chemical management practices and policies will prevent the need for large cleanouts in the future and will mitigate potential accidents, exposures, and other risks. Such practices may include: chemical purchasing polices; chemical management plans; required staff training; naming a school chemical hygiene officer (i.e. someone responsible for implementing responsible chemical management practices); and budgeting for appropriate storage and disposal.
- **Provide training to school administrators, teachers, and facility personnel.** Offering training as part of an SC3 program provides tools and information that administrators, teachers, and other facilities personnel can use in taking inventory of chemicals, conducting a cleanout, and instituting management practices. Furthermore, it is important to provide training throughout the different stages of the SC3 program, in order to provide current, relevant and practical information in a way that can be retained in the memory. Providing one comprehensive training session covering a broad array of topics may overwhelm trainees and prove ineffective.

Vermont's 'School Science Lab Chemical and Mercury Clean-Out Project' used a multi-phased approach to training. As a requirement of participation, and to receive a certification of completion, school staff had to attend a training session prior to the chemical inventory phase, which covered topics such as conducting an inventory and general lab safety. A second training workshop was held

following the chemical cleanout, which presented cleanout results, chemical management plans, and responsible purchasing practices.

You may want to consider incentives to make training opportunities more attractive to participants. These may include offering training at little or no cost to teachers or providing continuing education credits.

B. Potential Barriers to Achieving SC3 Program Success



Insufficient Resources and Low Priority Consideration for SC3 Programs

- **Funding.** Funding directly impacts many of the critical success factors that lead to ultimate program success. A state, tribal, or local SC3 program may have developed a comprehensive program incorporating responsible chemical management and cleanout, but without adequate funding, may not be able to effectively implement the program.

In many cases, SC3 programs may not have enough funds to tackle all of the schools that need assistance with chemical cleanout and training; however, they can provide funds to accommodate a portion of the activities or program components. An example of a program that did not have funding for chemical cleanout but still achieved success is the Montana Department of Environmental Quality “School Lab Outreach Program.” The Department of Environmental Quality (MTDEQ) launched an extensive and comprehensive outreach effort and developed a detailed Web site to assist schools with responsible chemical management. Most schools funded their chemical cleanout with their own budget. However, interviewees in Montana said that with additional funding MTDEQ could reach out to more schools, update outdated chemical inventories, and achieve greater success.

- **Low priority given to SC3 programs.** Chemical management must compete with other school budget priorities, from student academic achievement to keeping schools safe from crime. If chemical management is not seen as an imminent problem or concern, it may not be considered a top priority. Adding complexity to the budget decision-making and prioritization process is the fact that many school administrators, such as principals, do not feel qualified to tackle chemical management issues. Teachers and administrators may also feel they lack the time and knowledge necessary to understand these issues.

Program implementers noted some common barriers to successful SC3 programs...

- ❖ Insufficient funding;
- ❖ Limited staff resources for program implementation;
- ❖ Chemical management not considered a high priority;
- ❖ Resistance to change from established teachers;
- ❖ School staff turnover;
- ❖ Inadequate pre-service or practical training for *all* relevant school staff; and
- ❖ No follow-up compliance or technical assistance visits.



Staff Turnover, Knowledge, and Perspective

- **Staff turnover.** Many schools have to deal with high rates of staff turnover. When teachers or other staff members leave their positions, there may not be procedures in place to capture and transition important information on chemical management activities to new staff. Information as basic as the location of all of the chemicals (e.g., cabinets, storage rooms, janitorial closets) may not be known. Programs such as Maine's Department of Environmental Protection "Schools Program" and Vermont's "School Science Lab Chemical and Mercury Clean-Out Project" noted instances when new teachers found chemicals by accident or in unexpected locations. This lack of institutional knowledge could hinder implementation and the sustainability of SC3 programs. The impacts of turnover can be mitigated through a solid transition and training to whoever will assume chemical management responsibilities.
- **Resistance to change from established teachers.** Program implementers found that teachers who have been at a school for a while may want to hold on to unneeded "legacy" chemicals, even though they do not typically use them in routine classroom activities. This practice may stem from a belief that the chemicals will be useful in a future experiment or demonstration, or a concern that because of school budget constraints they won't be able to purchase needed materials in the future. In other cases, some teachers may be hesitant to experiment with unfamiliar, newer "green" approaches to teaching chemistry.
- **Lack of adequate pre-service or practical training.** School staff involved with chemical management activities may not have adequate or up-to-date training in responsible chemical management. For instance, many teachers have not specifically taken chemical safety or management courses as part of their college training. Some of the training that is offered does not provide practical information that teachers can easily apply when they return to their classrooms. In addition, the school's purchasing officer may not be well-versed in things that they could do to support responsible chemical management. Without proper training that emphasizes practical applications of information and techniques, SC3 programs may encounter implementation and sustainability difficulties, such as not knowing: Safer alternatives to chemicals used in classroom activities; proper chemical management and lab safety practices; which chemicals are no longer needed or are not stored properly; and, the benefits of keeping an updated chemical inventory.



Lack of Follow-Up

- **Lack of follow-up compliance or technical assistance visits.** States and other organizations implementing SC3 programs often do not have sufficient funds, staff, or authority to provide follow-up visits to ensure that schools comply with SC3 program requirements. In addition, many schools still require guidance and technical assistance following the cleanout process to properly institute and sustain responsible chemical management activities. This lack of follow-up visits and subsequent technical assistance and enforcement of the program requirements was cited as a barrier to success and program sustainability.

C. Ensuring Sustainability of Program Results

Program implementers identified the following best practices and approaches for sustaining successful SC3 programs. Ensuring that an SC3 program will prevent future chemical management problems is a key goal. Program implementers should consider incorporating provisions at the outset of an SC3 program for sustaining responsible chemical management and for conducting regular cleanouts in the future.

Champions, Technical Assistants, and Partners

- **Find a champion.** Involving someone who is not only knowledgeable but also passionate about SC3 issues is a key to program success and longevity. A champion can help secure funding, conduct outreach, and provide technical assistance—all factors that increase the likelihood of program success and sustainability. In Ohio, a retired chemistry teacher with a strong background in chemicals and lab safety gathered public support for Ohio’s “Hazardous Waste Removal Program,” taking the issue to the state legislature and securing over \$2 million in funding. In Iowa’s “Rehab the Lab” program, a staff person at the Metropolitan Waste Authority provided a significant portion of her time to promote the advantages of chemical management both in Iowa and to others around the country. Her knowledge and enthusiasm for the cause motivated individual schools and other SC3 programs. Ideally, a school principal, department chair, or superintendent—someone in a management position with input on budgeting and policy matters—would serve as an effective SC3 champion.
- **Use local universities and community partners for technical assistance.** Local colleges, universities and other community partners can provide technical expertise, training, and continuing education opportunities. In Rhode Island, the “Chemical Safe Schools Committee” program partnered with Brown University. The university provided technical assistance on chemical management activities. The Tennessee Department of Environmental Conservation has tapped a local college to create a Green Chemicals Manual that provides environmentally preferable “green” chemistry experiments for teachers.
- **Use partnerships to sustain long-term goals.** Partnerships are not only critical to building successful SC3 programs, but also to sustaining program goals. One way to sustain productive partnerships is to demonstrate partner benefits. In Iowa’s “Rehab the Lab” program, the Metropolitan Waste Authority approached the state’s school insurance carrier, EMC Insurance. The insurance company had been impacted by a chemical mismanagement incident that cost the company \$750,000. To reduce the risk of similar losses in the future, they became an active partner in Iowa’s program by including provisions for technical assistance for cleanout and responsible chemical management in all Iowa school insurance policies. Participating schools were offered a discount of five percent on their insurance policies for meeting the requirements of the SC3 program. This win-win solution offered incentives to both the schools and the insurance company; however, the real winners were the children and staff who worked in safer schools.

Incentives

- **Provide financial incentives to increase participation and sustainability.** In addition to the example above where participating schools were offered a discount of five percent on their insurance policies for meeting the requirements of the SC3 program, states have incorporated other financial incentives into their programs. Several interviewees mentioned that they required schools to “invest” in the program by paying a small fee for participation, based on criteria such as the number of students in the school or whether the school has more resources because it is in a city rather than in a less accessible location. Many interviewees observed that schools with some stake in the program are more motivated to participate and meet program requirements. An additional incentive was provided in one school district where substitute teachers were hired to attend to classrooms while the school’s permanent teachers were in chemical management training.



- **Explore partnering with state agencies to discuss potential regulatory incentives.** Consider approaching appropriate state, tribal, or local agencies (such as the departments of the environment, health and safety, or education) to discuss whether it is possible to use existing regulatory authority to promote compliance with SC3 program requirements. For example, in Maine, schools must inventory and submit a list of their on-site chemicals to the Department of Environmental Protection and the Department of Education on an annual basis. If a school does not comply, the Maine Department of Education can withhold vital school subsidy funding.

Another approach is offering schools regulatory amnesty for cleanouts and disposal of chemicals. Some schools may not want regulatory agencies to know the extent of their chemical management problems. Providing such schools an opportunity to participate without risk of regulatory or enforcement action is an incentive, which will likely result in more hazardous chemicals being removed.

- **Recognize successful efforts.** Publicly recognizing the organizations achieving results from an SC3 program can be a useful approach to motivate other schools to increase their chemical management efforts. In the Tennessee Department of Environmental Conservation (TDEC) program, schools receive pledge certificates, flags, decals, and public recognition that denote their participation in the program as well as their level of accomplishment. The TDEC program implementers also use these “success stories” when promoting the program to others, further recognizing the school’s achievements.

Funding



- **Mitigate unnecessary paperwork and transactional burdens on schools.** Rather than burdening individual schools with additional paperwork, SC3 program administrators should consider centralizing the management of the disbursement of funds to cover cleanouts, training, and other expenses associated with a

responsible chemical management program. This will also make it easier for SC3 program administrators to track program progress. For example, in the Rhode Island “Chemical Safe Schools Committee” program, funds were dispersed through a master purchase agreement that covered only SC3-related activities.

- **Utilize cost-effective chemical disposal principles and techniques.** Schools usually have tight budgets and adding the cost of safely removing unwanted chemicals often poses difficulties. SC3 programs should try to set up a central chemical collection point or leverage the services of Solid Waste Management Districts to defray the costs to schools and the program. EPA’s Region 5 asked school representatives in Oshkosh, Wisconsin to bring chemicals slated for disposal to a household hazardous waste facility that served as a central collection point. Vermont’s Department of Environmental Conservation worked with a Solid Waste Management District to use a licensed and insured hazardous waste collection truck to pick up chemicals slated for disposal, thus saving money in transportation costs.

Training and Outreach

- **Conduct multiple trainings throughout the lifecycle of chemical management.** It is important to provide training and education opportunities throughout the chemical management lifecycle. Each step, from taking inventory of chemicals to instituting long-term responsible chemical management policies, requires different types of knowledge and skills. It is not always feasible, appropriate, or effective to have one training session that provides information on each aspect of responsible chemical management. Instead, providing training sessions at different points in time, covering different topics, will help teachers remember more in the long run, thus promoting overall SC3 program success. Providing practical, hands-on training is best. King County, Washington’s “Rehab the Lab” program used this approach to help teachers identify hazardous chemicals in lab stockrooms and mark them for disposal.



- **Use existing training programs and forums to educate teachers and school staff.** Consider piggybacking on teacher in-service days, staff meetings, industry conferences, and other training opportunities to provide chemical management training to teachers and other staff. Using existing forums may improve attendance; leverage limited financial resources; ease scheduling difficulties; and allow teachers to participate without placing a burden on their personal time and resources. In Tennessee, SC3 program implementers made a list of opportunities such as conferences and in-service days that they used to schedule chemical management training, thereby maximizing participation and minimizing cost.
- **Use innovative outreach tools and approaches.** Use creative approaches to spread the word and educate teachers and school staff about the SC3 program and how to manage chemicals responsibly. For instance, in Iowa, all schools are equipped with a public television station that

broadcasts information to every school. Their “Rehab the Lab” program used these TV stations to promote the SC3 program and to conduct training sessions.

Conversely, some programs preferred to use a less direct approach, to avoid making school chemical management sound like a crisis to the public. For example, King County’s “Rehab the Lab” program was publicized through word-of-mouth bolstered by advertisements in science teacher newsletters.

Preventing Future Chemical Management Problems

- **Incorporate environmentally friendly, small-scale chemical practices into purchasing decisions.** Purchasing less hazardous chemicals in smaller amounts is a critical component in maintaining long-term responsible chemical management. Not only should the science department adopt this practice, but also the art, vocational and custodial departments. The key is to change behavior that will be reflected in a school’s business practices. Examples of such practices include:
 - ❖ Purchasing self-contained lab kits;
 - ❖ Maintaining a single school or district wide, up-to-date chemical inventory;
 - ❖ Centralizing chemical purchases;
 - ❖ Evaluating and authorizing potential chemical purchases; and,
 - ❖ Developing a budget for chemical needs.
- **Incorporate performance measures.** Developing and incorporating performance measures will highlight the program’s accomplishments and improvements. Examples of things to measure include the number of students and staff affected by the SC3 program; the amount of chemicals removed; the number of teacher training sessions that were completed; the number of teachers and administrators that were trained; and the number of schools making commitments to prevent future chemical mismanagement. These performance measures can be used to support budgeting and funding decisions, increase awareness, and garner support from potential partners.

D. Using SC3 Programs to Sustain Long-Term Chemical Management Success



A Flammable Chemicals storage cabinet helps achieve long-term responsible chemical management. Photo courtesy of TDEC.

While chemical cleanout is a critical near-term focus of SC3 programs, other program elements are equally important to prevent the need for future cleanouts and change behavior to decrease chemical risks in schools. SC3 programs should implement activities that change behavior and will ultimately result in achieving long-term outcomes and goals. When you institute practices for responsible chemical purchasing, use, management, and disposal it will result in program sustainability and self-sufficient schools in control of their chemical management situation. Consider integrating the following common program elements into your SC3 program.

- **Institute long-term chemical management policies and regulations.** Policies and standard operating procedures that promote responsible chemical management, such as chemical purchasing and proper chemical storage, should be implemented at the individual school or school district level in order to achieve long-term chemical management goals. Be mindful of unique situations in your state that may dictate how policies are developed and who is responsible for implementation. Institutionalizing and reinforcing policies and standard operating procedures will ensure good chemical management despite staff and teacher turnover.
- **Consider long-term planning and budget development.** Many of the common components of an SC3 program can be useful tools in long-term program sustainability. For instance, a chemical inventory can also be used as a planning and budgeting tool. Schools can assess the amount and type of chemicals they will need to carry out classroom, facilities and maintenance activities. This will help make informed planning, purchasing, and budgeting decisions and reduce the likelihood of unnecessary, improper, or duplicative chemical purchases.
- **Maintain responsible chemical management practices.** It is essential that SC3 programs put policies in place that advocate responsible chemical management practices. Implementing these policies will sustain chemical management progress. This will help schools ensure that future activities do not undermine accomplishments, trigger the need for future cleanouts, or increase the risk of accidents and exposures.
- **Maintain performance and compliance measures.** Develop a process for schools to easily report that they have met or exceeded the requirements for participation, showcase accomplishments, and identify challenges they overcame. Program results, in the form of a report or some other communication, should be sent at regular intervals to program implementers. This process is not only a low-cost compliance tool, but can also be used by schools to measure incremental success. Program implementers can also potentially use performance results in a variety of ways such as seeking program funding or attracting additional participants.
- **Acquire long-term technical assistance.** Schools are not necessarily equipped to tackle chemical problems without technical assistance. Providing a way for the school to get technical assistance, such as providing a contact in the school district who can answer questions about chemical disposal options, will help the school achieve long-term chemical management success. Such assistance will increase the schools' confidence in their ability to maintain their SC3 program success.

Establishing and sustaining SC3 program success...

- ❖ Institute long-term chemical management policies and regulations
- ❖ Consider long-term planning and budget development
- ❖ Maintain responsible chemical management practices
- ❖ Maintain performance and compliance measures
- ❖ Acquire long-term technical assistance
- ❖ Cultivate a mix of partners interested in long-term responsible chemical management

- **Cultivate a mix of partners dedicated to long-term responsible chemical management.** Having an appropriate mix of partners who can offer long-term technical expertise and financial resources will help maintain a robust SC3 program. Engaging partners early and assessing their potential contributions is important to determine if they will provide long-term assistance. Call upon local community partners, parents and teachers. These are partners who may have children in schools and who strive to provide community services. Industry partners can provide long-term technical assistance and other resources to ensure that responsible chemical management is sustained into the future.

E. Measuring Program Performance and Accomplishments

Performance measures are an important component of an SC3 program to monitor progress toward meeting goals; identify program deficiencies and corrective measures; and report program accomplishments. Performance measures can also be a useful for budgeting; meeting school or community environmental goals; making funding decisions; and designing effective responsible chemical management practices.

Typical performance measures used by the state and local SC3 programs include:

- ❖ Type and class of chemicals removed;
- ❖ Amount of chemicals removed;
- ❖ Number of training sessions completed;
- ❖ Number of teachers and administrators trained;
- ❖ School populations protected or serviced;
- ❖ Cost of cleanout per school; and,
- ❖ Number of schools making commitments to responsible chemical management or other “beyond compliance” activities.



Chemicals ready for disposal. Photo courtesy of TDEC.

In addition to these metrics, consider developing an approach or specific metrics to assess changes in behavior over time. A teacher’s ability to identify improper chemical storage or to enter chemical purchases into a central tracking system are examples of changes in behavior that can be documented. Because changes in behavior are difficult to measure, and measurement must take place over time in order to see the extent that new behaviors have become routine, SC3 programs implementers may want to set intermediate indicators or goals of behavior change. For example, if teachers continue to purchase chemicals without adhering to school-wide purchasing practices even after they have been trained to do so, follow-up discussions with teachers and modifications to the training should take place. Effective SC3 programs will result in behavior changes and create practices that will sustain chemically safe schools. It is

critical to develop a variety of performance measures that accurately and routinely capture a program's progress towards meeting its short, intermediate, and long-term goals.

Conclusion

Approaches for developing SC3 programs must be flexible and allow for adding components in phases when resources and conditions are right for your school. While each school has its own set of unique circumstances, the need for responsible chemical management practices that ensure schools are safe from chemical risks is common among all. The experiences and practical knowledge presented in this report are intended help you prevent chemical mismanagement in schools, thereby protecting children, teachers, staff and the environment.



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APPENDICES

Appendix 1 -- Evaluation Methods

Existing state/local SC3 programs were identified that might provide the best insights. Being mindful of the desire to evaluate a diverse, yet representative selection of programs, we worked to identify both EPA's SC3 funded as well as non-EPA funded state and local programs. We developed a list of candidate programs that reflected a diversity of locations, program budgets and scopes, and program maturities (see Appendix 2).

The next step involved developing selection criteria. Four categories of selection criteria were developed: program scope; program structure; program/school characteristics; and "other", which reflected data availability criteria. Based on those criteria we evaluated the following programs:

EPA SC3 Funded Programs

Rhode Island, "Chemical Safe Schools Committee";
Tennessee Department of Environment and Conservation SC3 Program;
SC3 Project in Oshkosh, Wisconsin; and
Iowa "Rehab the Lab".

Non-EPA Funded Programs

Maine, Department of Environmental Protection's "Schools Program";
Vermont, School Science Lab Chemical and Mercury Clean-Out Project;
Ohio, "Hazardous Waste Removal Program";
Montana, Montana Department of Environmental Quality's "School Lab Outreach Program"; and
King County, Washington "Rehab the Lab".

The evaluation project aimed to address the following information objectives:

- Critical success factors and barriers to SC3 program implementation;
- Best practices and approaches to building a successful SC3 program;
- Factors that contribute to program sustainability (including recruiting and retaining partners);
- Performance measures; and
- Ways to improve existing SC3 programs.

The evaluation methodology relied upon an interview-based approach that was supplemented by Internet research and document review. The objective of the interview process was two-fold: meet the information objectives and identify potential programmatic elements to serve as examples/case studies.

Although a list of interview questions was developed, a dynamic interview approach was adopted that adapted to the knowledge and experience of each interviewee. The dynamic approach allowed the interviews to be tailored based on a series of background or contextual questions (e.g., program implementers were asked about critical success factors). Using this approach makes the most efficient use of limited interview time while honing in on the interviewees expertise and knowledge. It also allowed us to seek input on unexpected findings and hypotheses put forth throughout the interview process. Program-specific questions included such topics as program description, funding, and program goals and outcomes.

For each state and local program, we typically interviewed Regional EPA personnel first, followed by a state, local, or other program contacts. Keeping in mind this is a formative evaluation, we asked program administrators to comment on program management recommendations in addition to specifics on state/local programs. In all we spoke with 19 people representing the 9 programs.

Throughout the interview process, we supplemented our information collection efforts with Internet searches, such as Lexis-Nexis, and document review. We reviewed numerous documents received from interviewees including presentations, press materials, status reports, funding applications, and communications and outreach materials. When available, we also visited each of the program websites for additional background information on the programs.

We established and adhered to a Quality Assurance Plan throughout the evaluation process. We crafted interview questions that tied to information objectives. Every interview involved two contractor personnel, thereby ensuring that comprehensive notes were taken and all relevant questions and follow-up inquiries were made. We sent follow-up emails to certain interviewees to clarify statements and collect additional documents and information for review.

Appendix 2 – Program Summaries

Twelve candidate programs were identified for consideration in the formative SC3 evaluation. The candidate programs include 6 initiatives that were funded by EPA in 2004 and 6 state or local initiatives that were not funded with EPA SC3 funds. The location and name of the programs are as follows:

EPA Region 1, Rhode Island, "Chemical Safe Schools Committee"

The "Chemical Safe Schools Committee" (CSSC) is a public-private partnership working to address chemical management issues in schools. The partnership members include the Rhode Island Departments of Health, Education, Environmental Management (DEM), and Labor and Training; Brown University; Community College of Rhode Island; Rhode Island Committee on Occupational Health and Safety; Rhode Island Fire Marshall's Office; and private business. Their goal is to support schools and districts in minimizing health risks from chemicals through development of guidance materials, training and professional development opportunities, and the use of regulatory authority.

The CSSC successfully worked to incorporate a list of banned chemicals into the Rhode Island *Rules and Regulations for School Health Programs* in 2003. The Rhode Island Department of Health, on behalf of the Committee, used EPA SC3 funds to assist public and charter high schools with chemical removal. Only schools that have developed a Chemical Hygiene Plan were eligible for assistance. The Chemical Hygiene Plan must address chemical purchase, storage, disposal, personal protective equipment and contain an inventory. Greater consideration is also given to school systems that have a greater community need (defined as a percentage of children receiving free or reduced cost lunches). As of 2006, 4,686 students were impacted by the chemical cleanouts in a total of eight schools.

Currently, the CSSC works to educate school personnel and others on chemical management issues. The Rhode Island DEM also assists schools by providing technical expertise. DEM works with the Department of Labor, who has the authority to conduct school inspections, to share information on chemical management concerns at schools.

EPA Region 4, Tennessee Department of Environment and Conservation SC3 Program

Beginning in the fall 2004, selected schools in Tennessee participated in the School Chemical Cleanout Campaign. The SC3 program was an expansion of a previous pilot program facilitated by the Tennessee Department of Environment and Conservation (TDEC)/ Division of Community Assistance's "Green Schools Program". The Green Schools Program stems from a partnership among TDEC, the Tennessee Science Teachers Association, the Tennessee Valley Association, Onyx Environmental, and the Tennessee Department of Agriculture.

TDEC's SC3 programs seek to reduce waste, eliminate outdated, unknown and unusable chemicals from schools, encourage environmentally sound use of chemicals in classrooms, bring cost savings to schools through responsible chemical management, and promote SC3 success state-wide. TDEC's programmatic components included lab chemical inventories, disposal, and teacher training. TDEC staff conducted numerous trainings and also partnered with a local university to develop a green chemistry handbook for teachers.

TDEC has been successful in reaching their goals and is has even assisted school districts in other states with their SC3 programs. In total, 69 schools were cleaned out with 23,000 lbs of hazardous chemicals

removed. TDEC leveraged various EPA grant-funding sources by requiring schools to contribute funds based on their socio-economic status.

EPA Region 5, Oshkosh, Wisconsin SC3 Project

EPA Region 5 is using SC3 funds to reduce the amount of hazardous chemicals, including mercury and lead, and increase chemical awareness in schools. The program focuses on schools in under-served areas. Each school must complete a chemical audit. This audit will not only identify the hazardous, expired and infrequently used laboratory chemicals, but will serve as a teaching tool to identify lab safety issues and assist teachers in more effective purchasing of chemicals. Following the audit, chemicals will be collected for disposal.

Each school is provided intensive technical assistance, both on-site and by phone, to assist implementation of best management practices for chemical reduction and management. Schools are encouraged to make commitments to proper chemical management “beyond compliance” with the program. For example, schools may change purchasing policies or refuse to accept donated chemicals. The ultimate goal of the program is to promote increased self-sufficiency in chemical management and also strengthen existing partnerships with departments of health, education and environmental organizations.

EPA Region 7, Iowa's “Rehab the Lab”

The EPA Region 7 currently facilitates the Iowa school cleanout effort through onsite compliance assistance visits and a partnership with Des Moines Metro Waste Authority (MWA). As of 2006, 182 schools of 366 have been reached, with 206,905 lbs of hazardous chemicals removed. The Iowa program not only focuses on the removal of excess laboratory chemicals, but also waste storage practices, responsible chemical management, and education of teachers, administrators, and facilities personnel. The MWA has been supporting SC3 efforts in Iowa since approximately 2000. The EPA SC3 funding has allowed MWA to reach out to more schools and develop a series of training sessions to complement the efforts. MWA has been successful in partnering with EMC Insurance Company to expand the program throughout the state and ensure chemical management efforts are in place for years to come. EMC works with schools to implement responsible chemical management activities as a requirement of their insurance packages. This also results in discounts on insurance premiums and ensures relevant schools are adequately trained. The school staff completes extensive training that focuses on environmental compliance awareness, waste stream identification, alternatives, and a review process for on-site assessment.

Maine Department of Environmental Protection's “Schools Program”

In 2003 and 2004, the Department of Environmental Protection (DEP) conducted a mercury and chemical cleanout program for schools. Through the program, 6,500 pounds and over 1,000 gallons of hazardous wastes and 800 pounds of mercury were removed from science labs, maintenance departments, art and vocational classrooms, and nurses’ stations in 80 schools. Radioactive materials were also discovered in nearly a dozen schools, and were subsequently removed. As part of the program, DEP, in partnership with the Department of Labor, also held chemical management workshops for school faculty.

In 2005 as a result of the growing concern over hazardous chemicals in public schools, the Maine legislature directed the Departments of Education and Environmental Protection to develop recommendations for assisting school districts. The resulting stakeholder group recommended hiring a statewide chemical coordinator as well as local/regional coordinators to ensure sound chemical

management programs in schools. Legislation will likely occur with respect to the recommendations of the stakeholders group in 2007.

In 2006, the Department of Education coordinated a clean out effort for nearly 75 schools. Chemicals were cleaned out of schools at each school's own expense, but at a negotiated reduced rate available through a particular vendor.

Vermont, "School Science Lab Chemical and Mercury Clean-Out Project"

The School Science Lab Chemical and Mercury Clean-Out Project was established and funded by the Vermont Department of Conservation (DEC) from 1999-2001. The project's objectives were to dispose of outdated and hazardous chemicals, reduce the amount of hazardous chemicals purchased, encourage school labs to remove all mercury compounds and discontinue future mercury use, and educate science teachers on proper handling, storage, and disposal of hazardous chemicals. Participating schools were assisted with conducting chemical inventories, chemical disposal and establishing safe storage systems. In addition, the project offered teacher training workshops and required all schools to develop a chemical management plan for labs.

DEC considered the project highly successful, not only from the lab cleanout perspective, but for its lasting impact on proper chemical management in schools. Eighty-three middle and high schools participated in the project, representing over half of the Vermont student population. According to DEC, the project resulted in about 17,000 pounds of hazardous materials and 156 pounds of mercury. It has been reported that the average total cost per school for cleanout and training was \$1,450. The DEC minimized costs by using state agency staff and the municipal solid waste district staff.

Ohio, "Hazardous Waste Removal Program"

In the late 1990s, the Ohio EPA and the Ohio Department of Education partnered to implement a state legislature funded \$2.9 million hazardous waste removal program in Ohio schools. According to the Ohio EPA, the program was the first of its kind in the country and ultimately removed over one million pounds of chemicals from 196 schools (90% of Ohio school districts). All of the 196 schools had "high hazard" materials that required special handling to be removed. Many of the chemicals collected were acquired prior to World War II. As a result of the two-year effort, student safety and awareness dramatically increased. Nearly 1,000 school officials and teachers attended chemical management and safety seminars. Prior to the effort, only about 1.6% of teachers had received any type of training. It has been reported that the cost of removal averaged less than \$3,000 per school and the cost savings per school averaged \$10,000—money that would have been spent on a commercial cleanup service.

Montana Department of Environmental Quality "School Lab Outreach Program"

In August 2004, Montana Department of Environmental Quality (MDEQ) surveyed 408 middle and high schools statewide to collect information on the types of chemicals present in school science labs. Over 38% of the schools responded, reporting a total of 570 different chemicals. As of June 2006, a total of seven schools and approximately 3,000 pounds of hazardous chemicals have been removed and properly disposed. Cleanouts are planned for an additional three schools including two in Indian Country.

MDEQ also organized a series of one-day training courses on school lab chemical safety and management during the last two weeks of September 2005. The workshops, which were conducted by Safety and Science Education Consultants, Inc., were held in nine communities. Personnel from schools in 43 communities attended the workshops. 114 teachers, administrators and school custodians completed the

workshops. The Business and Community Assistance Program of MDEQ has received grant funding that will be used to assist schools in the proper removal and disposal of unwanted chemicals.

MDEQ has a comprehensive website that provides chemical management resources on lab safety, suggested approaches for taking inventory of chemicals, ideas for improving chemical purchasing and other topics. MDEQ has also received funding from EPA to expand the Laboratory Cleanout Program and the funds are to be dedicated to removing chemicals from more schools in Montana.

King County, Washington's "Rehab the Lab"

King County, Washington's "Rehab the Lab" Program offered assistance, free of charge, to King County schools to manage their hazardous chemicals. The Program provided chemical experts from the County's hazardous waste office to train teachers about chemical storage and disposal. The program also helped teachers to rethink what chemicals they actually needed and for what purpose. At the outset, there was some reluctance by school officials and teachers to dispose of the chemicals, citing no funds were available to order replacement materials. However, in the end, most decided to participate in the program. Over a four-year period, the program cost \$560,000 and was primarily funded by surpluses in sewer and garbage surplus collection fees. The program paid 100% of laboratory chemical disposal and partial assistance for removing art supplies and photo chemicals. In total, 39.5 tons of chemicals were removed.

The program continues to provide education, assessment and advice aimed at school laboratories. The state provides matching grants to cover the cost of the initial site audit, collection and disposal costs and teacher training. In addition, fully scripted lesson plans, chemical lists, and various informational brochures are available online. The King County program has not only served as a model for others in Washington, such as Thurston County, but to schools across the nation including Iowa, Missouri and Colorado.

(For more information about state programs in general, please see the document *Building Successful Programs to Address Chemical Risks in Schools: Summaries of State, Tribal, and Local Schools Chemical Cleanout Campaign Programs* available at: <http://www.epa.gov/sc3/>)

Appendix 3 -- Interview Questions

SC3 Evaluation Questions for EPA Regional Personnel

Background/Context

- Describe your involvement in the program/describe your interaction with those leading the program
- How long have you been aware/involved with the program?
- How long has the program been in existence?
- What is the program's purpose? Is it part of a larger effort?
- Is a chemical management program/cleanout/inventory required by law/regulation?

Program Specific Questions

Program Description

- Please describe the main themes of your program. For example, does it involve cleanout? Taking inventory of school chemicals/hazards? Outreach? Guidance? Policy development?
- What was the impetus for the program?
- What was the thought process behind determining the main themes or components of your program?
- What are the program components?
- Give us a sense of the scope of the program. For example:
 - How many schools are involved? What percentage of total? Elementary, middle (define), high school? How many kids impacted, faculty impacted?
 - How many people were involved in the program and what was the total FTE required to implement the program? (e.g., 2 FTE of 10 teachers' time)
- Please describe the structural elements of your program. For example,
 - Describe the roles and responsibilities of key personnel in the program.
 - Was work performed under an already existing contract/grant vehicle?
 - What is the labor mix (e.g., # teachers)
 - Compensation – was there a voluntary/pro bono/in kind aspect of the program? Who got compensation (e.g., do teachers get paid?)?
- Please describe any partnerships formed or stakeholder involvement in the implementation of the program.
 - What was their role?
 - What impact did they have?
 - Do you feel they are an integral part of the program? Why or why not?
 - Do you feel it would be helpful to speak with any of the partners or stakeholders? If so, could you provide me with contact information?
 - Was a stakeholder group formed/used? Was it ad hoc, already established, did it become permanent?

Funding

- What has been the total funding to date? Can you provide an approximate estimate of the funding for each year of the program to date?
- What are the sources of your funding? Did the program have matching funds or another source of funds besides EPA? If so, how do you think that impacted the success of the program?

Program Goals and Outcomes

- What has been the biggest accomplishment(s) of the program?
- Do you feel the program has made schools safer? Please describe.
- Do you feel the program has reduced risks of releases / exposure going forward?
- Describe any changes in policies, procedures, or behavior (e.g., chemical purchasing or chemical management policies).
- Does your program establish performance measures up front? If not, when were performance measures defined and tracked? Please provide any details on your program's consideration and use of performance measures.
- Has there been any resistance to this program? Please describe the substance and source of any resistance encountered.
- What factors would you identify as being critical to the success of the program?
- In that area/local vs. global
- Was the program primed or were other environmental/conservation/p2 type activities taking place prior to the SC3 program?
- What factors would you identify as being impediments to the success of the program?
- Do you have any suggestions for improvement of your program?