PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

School Chemical Cleanout Campaign (SC3)

Chemical Safety Audits

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Chemical Safety Audits

I. INTRODUCTION

A. An audit is a systematic review of operations and practices to ensure that relevant requirements are met.

B. Audits evaluate all aspects of the program with special emphasis on the quality as well as the quantity of safety and health activities at every level. The basic goal of an audit is to verify that health and safety activities comply with institutional policies and federal, state, and local regulations.

C. An audit consists of two parts: data collection and data evaluation.

D. A safety audit is a structured, methodical assessment and evaluation of how workplace activities affect safety and health. It serves as a report card on the success of safety and health programs, environmental programs, and process safety management.

II. THREE MAIN ACTIONS

A. Arrange interviews with facility personnel who have key roles in developing or implementing safety management systems.

B. Review documentation that defines safety system records or verifies completion of critical tasks.

C. Conduct field assessment of the facility or equipment.

III. ADMINISTRATIVE CONCEPTS

The following list provides a framework for developing evaluation criteria.

A. Assignment of Responsibility

B. Emergency Preparedness

C. Employee Awareness, Acceptance of Responsibility, and Participation

D. Identification, Control, and Monitoring of Potential Hazards

E. Management Leadership

F. Maintenance of Safe Working Conditions

G. Medical and First Aid Systems

H. Safety, Health, and Environmental Record Keeping and Statistics

I. Safety Organization and Administration

J. Safety Policy, Program, and Activities

K. Safety Rules, Regulations, and Procedures

L. Safety Training and Education

IV. PHYSICAL CONCEPTS

The organization and administration of every school safety program require that management makes a complete and competent effort to provide a safe place for learning. The importance of a safe physical environment cannot be overemphasized. Physical concepts to be considered include the following topics.

A. Compliance
B. Identification of Exposures
C. Safeguarding Exposures
D. Protection and Guarding
E. Safety Organization

V. PROTECTING YOUR AUDITS

The following are questions that need answered prior to conducting a safety audit.

A. Is an audit a protected internal document?
B. How much information is available to the public?
C. What does the public have a right to know?
D. What does the government have a right to know?
E. Does the government have the right to view audit reports?
F. Can regulatory agencies use information found in these reports?

The information presented today is a summary outline of Chapter 1 Safety Audits from the **SAFETY AUDIT/INSPECTION MANUAL**, a Publication of the American Chemical Society – Committee on Chemical Safety, copyright 2000, Washington, DC. The document is available for download at http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/safety-audit-inspection-manual.pdf

CHEMICAL SAFETY RESOURCES

A. National Science Teachers Association (NSTA) - Resources related to Safety in the Science Laboratories & Classroom: The following safety issue papers have been written by the NSTA Safety Advisory Board to address important current safety issues in school science laboratories and classrooms. They are based on legal safety standards and better professional practices.

1. Globally Harmonized System of Classification and Labeling of Chemicals (PDF) [added 2014.05.20]

2. Duty or Standard of Care (PDF) [added 2014.05.02]

3. Overcrowding in the Instructional Space (PDF) [added 2014.05.02]

4. Safety in the Science Classroom, Laboratory, or Field Sites (PDF) [added 2013.05.23]

5. Tips for the Safer Handling of Microorganisms in the School Science Laboratory (PDF) [added 2012.05.09]

6. Safety Acknowledgment Form for Working with Microorganisms (PDF) [added 2012.05.09]

7. YouTube and Other Public Posting of Science Demonstration Videos (PDF) [added 2012.05.09]

8. Safe Handling of Alcohol in the Laboratory

http://www.nsta.org/safety/

B. The US Chemical Safety Board (CSB): An independent federal agency investigating chemical accidents to protect workers, the public, and the environment.

1. "After the Rainbow" - A five minute video safety message focusing on preventing accidents in high school chemistry laboratories, US CSB, Tuesday, Dec 10 2013.
   http://www.csb.gov/videos/after-the-rainbow/

2. "Key Lessons for Preventing Incidents from Flammable Chemicals in Educational Demonstrations - Eliminating Flash Fire Hazards by Substituting or Minimizing the use of Flammable Chemicals and Performing an Effective Hazard Review Will Prevent Injuries."
   Published by the US CSB, October 2014
   http://www.csb.gov/assets/1/19/Lab_Safety_Bulletin_2014-10-30.pdf

C. Publications of the American Chemical Society Joint Board–Council Committee on Chemical Safety

1. "Reducing Risks to Students and Educators from Hazardous Chemicals in a Secondary School Chemical Inventory"

   The Safe Practices Subcommittee undertook the task of compiling a partial list of chemicals that it believes should not be found in a secondary school chemical inventory or used by individuals who are not knowledgeable and skilled in working with high-hazard chemicals.

http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/reducing-risks-to-students-and-educators-from-hazardous-chemicals.pdf

2. "Chemical Safety for Teachers and Their Supervisors Grades 7–12"

   The theme of this handbook is prevention of accidents. Preventing accidents with chemicals involves two requirements: Knowledge and the Habit of Safety.

http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/chemical-safety-manual-teachers.pdf

3. "Student Laboratory Code of Conduct for Secondary Science Program"

   A Student Laboratory Code of Conduct is an important element in the effort to ensure a safe and healthy environment in the science classroom and laboratory. This document developed by the American Chemical Society provides a template.

http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/student-laboratory-code-of-conduct-pdf.pdf

4. "Safety in the Elementary Science Classroom 3rd Edition"

   This booklet is designed to assist elementary science teachers with one of the special aspects of teaching science—creating a safe experimental environment for students.

http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/safetypractices/safety-in-the-elementary-school-science-classroom.pdf

5. "Guide for Chemical Spill Response Planning in Laboratories"

   This guide provides laboratory employees with a framework for spill response planning. This planning must be done in advance, not after a spill occurs.

http://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/publications/guide-for-chemical-spill-response.html

D. National Research Council - The National Academies Press

"Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards" (Updated Version published in 2011)

Developed by experts from academia and industry, with specialties in such areas as chemical sciences, pollution prevention, and laboratory safety, this valuable resource provides guidance on planning procedures for the handling, storage, and disposal of chemicals.

http://www.nap.edu/catalog.php?record_id=12654

E. United States Environmental Protection Agency (US EPA)

"Chemical Management Resource Guide for School Administrators"

This practical guide can help your school reduce the use of dangerous chemicals and install safer chemical management practices. It is aimed especially at helping school administrators to set policies that protect against dangerous chemical exposures. It is also aimed at helping parents and concerned citizens to determine if their children's schools are minimizing potential exposure to dangerous chemicals. Included is the "HealthySEAT" tool developed for schools by EPA to address chemical management and other environmental, safety and health issues.

http://www.epa.gov/oppt/pubs/chemmgmt/

F. National Institute for Occupational Safety and Health (NIOSH)
The agency within the US Department of Health and Human Services – Centers for Disease Control providing national and world Leadership to prevent workplace illnesses and injuries.

1. "School Chemistry Laboratory Safety Guide" DHHS (NIOSH) Publication No. 2007–107

The guide presents information about ordering, using, storing, and maintaining chemicals in the high school laboratory. The guide also provides information about chemical waste, safety and emergency equipment, assessing chemical hazards, common safety symbols and signs, and fundamental resources relating to chemical safety, such as Material Safety Data Sheets and Chemical Hygiene Plans, to help create a safe environment for learning. In addition, checklists are provided for both teachers and students that highlight important information for working in the laboratory and identify hazards and safe work procedures.
This guide is not intended to address all safety issues, but rather to provide basic information about important components of safety in the chemistry laboratory and to serve as a resource to locate further information.

http://www.cdc.gov/niosh/docs/2007-107/pdfs/2007-107.pdf

2. “NIOSH Pocket Guide to Chemical Hazards” DHHS (NIOSH) Publication No. 2010–168c

   The Pocket Guide is a source of general industrial hygiene information on several hundred chemicals/classes found in the work environment. Key data provided for each chemical/substance includes chemical/trade names and synonyms; structure/formula; conversion factors; CAS/ RTECS/DOT ID and Guide numbers; NIOSH/OSHA exposure limits; IDLH concentrations; physical description, chemical and physical properties of agents; measurement methods; personal protection/sanitation recommendations.

   http://www.cdc.gov/niosh/docs/2010-168c/

3. “School Health Index”

   The School Health Index (SHI): Self-Assessment & Planning Guide 2014 is an online self-assessment and planning tool that schools can use to improve their health and safety policies and programs. It's easy to use and completely confidential.

   The School Health Index (SHI) was developed in partnership with school administrators and staff, school health experts, parents, and national nongovernmental health and education agencies to:
   - *•Enable schools to identify strengths and weaknesses of health and safety policies and programs*
   - *•Enable schools to develop an action plan for improving student health, which can be incorporated into the School Improvement Plan*
   - *•Engage teachers, parents, students, and the community in promoting health-*

   http://www.cdc.gov/healthyyouth/shi/

G. Flinn Scientific

Free on-line School Laboratory Safety Courses include: High School Safety, Middle School Safety, GHS Training, Chemical Storage Area Clean Up Plan, Laboratory Design, and Science Classroom Safety and the Law.

http://www.flinnsci.com/

H. Rehab the Lab: Creating Safer School Labs

Offers downloadable lesson plans for least toxic chemistry labs, a database of school chemicals and training videos to help schools safely store, handle and dispose of their chemicals.

http://www.lhwmp.org/home/educators/rehabthelab.aspx