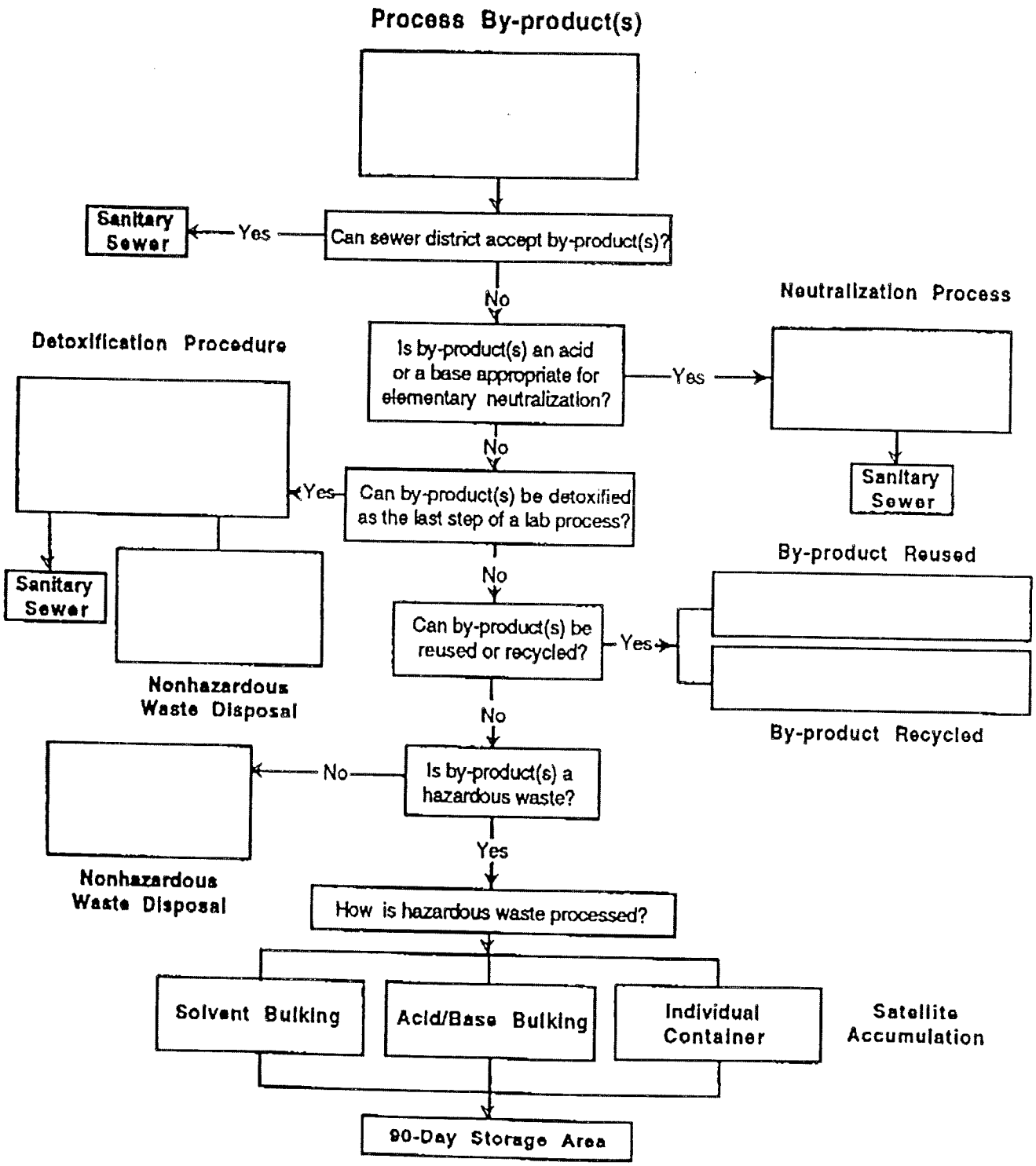
Process By-product(s) Module

Module Designation _____



Duffield Hall Laboratory Process Unit Review

Principle Investigator: _____

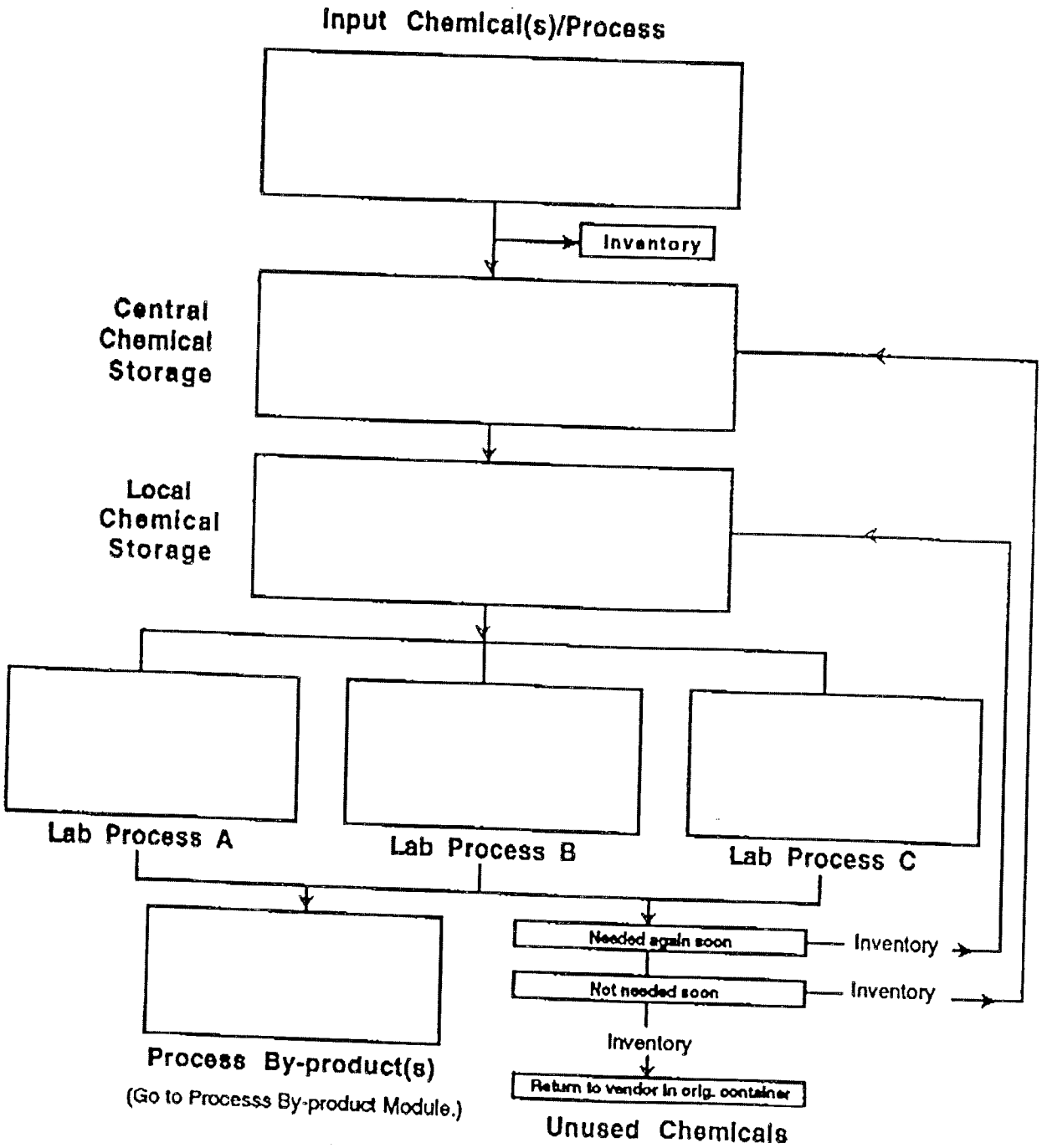
Department: _____

Campus Address: _____

Phone Number: _____ E-mail Address: _____

Person Completing this Form: _____

Phone Number: _____ E-mail Address: _____



LPU Overview

Written by Milly Archer

This file provides a brief overview of the LPU concept. This idea originated in the California Task Force Report.

Concept: The Purpose of the LPU concept is to answer the question: "when is a waste a waste for laboratories?"

The LPU

A. What is the LPU?

1. **Room or group of laboratory rooms under the control of a supervisor or principle investigator.**
2. **All Chemicals (wastes and materials) in the LPU are considered materials while in the LPU.**
3. **Analogous to the "manufacturing process unit" described in 40CFR 261.4; hazardous wastes would not be regulated until after they are removed from the LPU.**

B. Justification for the LPU.

1. **Necessary regulatory control is already covered under:**
   a. **OSHA-CHP**
   b. **Fire Codes**
   c. **Sewer use ordinances**
   d. **RCRA contingency plans (i.e. if spilled the material becomes a waste).**
2. **Waste materials are already removed from the LPU on a timely basis because of physical space constraints.**
3. **The determination of whether or not a hazardous material is regulated as a hazardous waste can be made by a technically qualified person, who has been given that responsibility.**
4. **The current interpretation of "process" as a single step in an experiment or single apparatus defines a byproduct as a hazardous waste before the material can be identified for reuse or recycling.**

C. Some Regulatory Snags in the LPU concept.

1. **The LPU concept would eliminate regulators' ability to conduct inspections necessary to verify compliance with environmental laws and regulations.**
   a. **inadequate labeling may lead to improper storage or mixing of incompatible wastes.**
   b. **storage of wastes for extremely long time periods.**
   c. **improper disposal.**

2. **The LPU is not adequately regulated under OSHA.**
    a. **OSHA lab standard authority applies only to employees rather than all lab personnel.**
    b. **OSHA requirements do not extend to the protection of the environment.**
    c. **OSHA traditionally responds to complaints or incident reports and does not conduct routine inspections of laboratory operations.**
    d. **OSHA lab standard is not designed to address the proper storage, treatment and disposal of hazardous wastes, except in the context of worker protection.**
3. **The LPU approach would be less stringent than the RCRA regulations and would require a modification in the existing regulations (or a successful Project XL proposal!)**

D. LPU plus Institutional Waste Management Plan (best management practices)

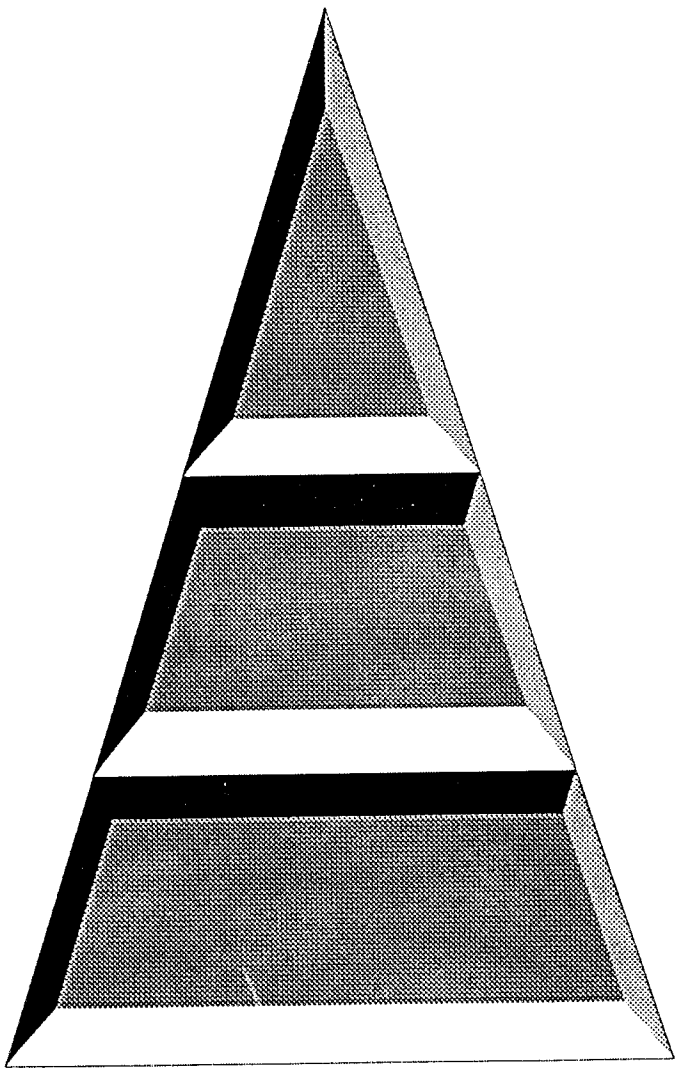
1. **The LPU would be a laboratory area under the control of an individual who makes the waste determination.**
2. **Delineated by the institution in an institutional waste management plan (which could be incorporated into the CHP).**
3. **The Plan would be performanced-based to address:**
    a. **accumulation times.**
    b. **container requirements.**
    c. **quantity limits in storage.**
4. **Elements of an Institutional Waste Management Plan.**
    a. **Procedures to limit accumulation times and amounts.**
    b. **Procedures for labeling wastes with identity and hazards.**
    c. **Waste management training.**
    d. **Procedures for bench top treatment of wastes.**
    e. **Procedures for disposal, including site specific prohibitions on drain disposal.**

Back to LAB XL Index Page

---

http://esf.uvm.edu/labxl/lpoutline.html Version 1.1
HTML by Ralph Stuart Last Updated: July 2, 1997

THE ALTERNATIVE RCRA MODEL



Organizational Environmental Policy Statement

Defines the commitment of the organization to legal compliance, pollution prevention, continual improvement of the EMS and provides the framework for the achievement of the institution's environmental aspirations.

Institutional RCRA Compliance System

Includes policies and procedures, planning activities, organizational structure, responsibilities and resources for safely and effectively managing hazardous wastes in accordance with RCRA compliance requirements.

Laboratory Process Units (LPU)* Environmental Management Plan

Includes policies and procedures, planning activities, organizational structure, responsibilities and resources for safely and effectively managing hazardous chemicals in the laboratory and preventing their uncontrolled release from the laboratory to the environment

Proposed Laboratory Environmental Management Standard
DRAFT 9-Jan-98

A. Scope and Application: This standard applies to all workplaces engaged in the laboratory use of hazardous substances as defined below:

1. Where this standard applies, it shall supersede, within the laboratory, the requirements of 40 CFR Parts 260, 261, 262, 263, 264 and 265.

2. This standard shall not supersede any other legal requirements, including, but not limited to, OSHA, Fire Codes or other legal requirements applicable to laboratories

3. This section shall not apply to: (i) laboratory uses of hazardous chemicals which provide no potential for employee exposure; and (ii) laboratories that do not generate solid wastes that require management as hazardous wastes.

B. Definitions

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

"Emergency" means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in a potential uncontrolled release of a hazardous chemical to the environment which may require notification and reporting.

"Environmental Management Officer" means an employee or individual who is designated by the organization, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the Environmental Management Plan.

"Environmental Management Plan" means a written program developed and implemented by the organization which sets forth procedures, pollution control equipment, resources and work practices that (i) are capable of protecting human health and the environment from the hazards presented by hazardous substance byproducts within the LPU (ii) meets the plan requirements defined elsewhere in this standard. Certain requirements of this plan may be satisfied through the use of the Chemical Hygiene Plan, or equivalent, and other relevant plans (e.g., waste minimization plan). The Environmental Management Plan may be integrated into such existing plans, incorporated as an attachment, or developed as a separate document.

"Environmental Management System" (EMS) means the part of an organization's management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing and maintaining the environmental requirements of the organization.

"Environmental Performance" means results of the Environmental Management Plan implementation as measured against policy, objectives and targets.

"Environmental Performance Indicator" means a specific metric that provides information about the organization's environmental performance.

"Environmental Professional" means an employee or an individual assigned by the organization to manage the organization's compliance with relevant sections of the Resource Conservation and Recovery Act, or state equivalent regulations.

"Environmental Objective" means an overall environmental goal of the organization which are quantifiable, where practicable.

"Environmental Target" means an environmental performance requirement of the organization which is quantifiable, where practicable, verifiable and designed to be completed within a specified time frame.

"Hazardous Chemical" means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes or mucous membranes.

"Hazardous Substance" means 1) any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise released into the environment.

"Hazardous Substance Byproduct" means a hazardous substance that results from a laboratory experimental process and that is not one of the primary products that may be further used, processed, treated, or sampled (e.g., archival sample) by the researcher. Waste determinations of hazardous substance byproducts are conducted after the substance exits the LPU.

"Hazardous Waste" means a hazardous waste as defined in Section 261.3 of the Resource Conservation and Recovery Act.

"Laboratory" means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

"Laboratory Process Unit" (LPU) means a laboratory room, or group of laboratory rooms, within a building, that is managed by a laboratory supervisor and which share a significant amount of equipment, materials and/or personnel. These units are commonly managed in conformance with the laboratory's Chemical Hygiene Plan (29 CFR 1910.1450) or equivalent.

"Laboratory Scale" means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by

one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

"Laboratory Supervisor" means an individual assigned by the organization to manage LPU activities in accordance with the Environmental Management Plan.

"Laboratory Use of Hazardous Chemicals" means handling or use of such chemicals in which all of the following conditions are met: (i) Chemical manipulations are carried out on a "laboratory scale;" (ii) Multiple chemical procedures or chemicals are used; (iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and (iv) "Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

"Laboratory Worker" means people who are assigned to handle hazardous chemicals in the laboratory.

"Legal and Other Requirements" means requirements imposed by, or as a result of, governmental permits, governmental laws and regulations, judicial and administration enforcement orders, nongovernmental legally enforceable contracts, research grants and agreements, certification specifications, formal voluntary commitments and organizational policies and standards.

"Nonconformance" for the purposes of this standard, means activity, behavior or work practices that do not conform to the requirements of the Environmental Management Plan.

"Organization" means institution, company, corporation, firm, enterprise or authority or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration.

"Top Management' means senior personnel with overall responsibility, authority and accountability for managing laboratory activities within the organization.

"Waste Minimization" means practices and measures that minimize waste including, but not limited to source reduction, reuse, recycle and bench-top treatment of hazardous substances or small scale treatment of hazardous wastes.

C. Organizational Responsibilities

Under the requirements of this standard, the organization's environmental professionals shall be responsible for the following:

1. Developing and overseeing implementation of the Environmental Management Plan

2. Defining Laboratory Process Units (LPUs) and assigning responsibility in the laboratory for conformance to the Environmental Management Plan

3. Determining whether hazardous substance byproducts or unused hazardous substances, after exiting the LPU, are to be managed as solid and hazardous wastes

4. Defining environmental objectives and targets

5. Developing, implementing and maintaining policies, procedures and practices governing the organization's compliance with applicable Resource Conservation and Recovery Act, and state equivalent, regulations.

6. Developing and implementing procedures to monitor and measure relevant compliance and environmental performance data.

7. Evaluating on an ongoing basis environmental performance as it relates to the implementation of the Environmental Management Plan within LPUs and compliance with applicable legal and other requirements and identifying opportunities for the continuous improvement of the Environmental Management System (EMS).

8. Developing, implementing and maintaining policies and procedures for managing environmental documents and records in accordance with legal and other requirements.

9. Ensuring that the Environmental Management Plan is reviewed at least annually by top management to ensure its continuing suitability, adequacy and effectiveness. The reviews may include, but not be limited to, a consideration of monitoring and measuring information, EMS performance data, assessment and audit results and other relevant information and data.

D. Environmental Management Plan - General

(Appendix A of this section is non-mandatory but provides guidance to assist organizations in the development of the Environmental Management Plan - to be included in the future - this guidance might suggest some of the suggested "prescriptive" items included in the initial exposure draft)

Where hazardous substances are used in the laboratory, and hazardous wastes may be generated as a result of laboratory activities, the organization shall develop and carry out the provisions of a written Environmental Management Plan which is designed to protect human health and the environment from hazards associated with the management of hazardous substance byproducts and from the reuse, recycling or disposal of hazardous substances external to the LPU.

1. The Environmental Management Plan shall be readily available to individuals in the LPU, including laboratory workers, vendors, employee representatives, visitors, on-site contractors and, upon request, to governmental representatives.

2. The Environmental Management Plan shall define the framework in the LPU for meeting the organization's environmental commitment and conforming to the organization's environmental policies and procedures pertaining to this standard.

3. The Environmental Management Plan shall be adopted by each LPU.

4. The Environmental Management Plan shall include each of the following elements and shall indicate specific measures that each LPU and the organization will take to protect human health and the environment from hazards associated with the management of hazardous substance byproducts and from the reuse, recycling or disposal of hazardous substances external to the LPU.

a. An environmental or environmental, health and safety policy, signed by the organization's top management, that includes commitments to regulatory compliance, waste minimization, risk reduction and continual improvement of the environmental management system

b. Roles and responsibilities will be assigned for implementation and maintenance of all aspects of the Environmental Management Plan

c. The resources provided to implement the plan

d. The organization's system for identifying and tracking applicable laws, regulations and other legal requirements applicable to LPUs, including the procedures for providing updates to laboratory supervisors.

e. Criteria that the organization will use to determine hazards and risk and control measures to reduce potential releases of hazardous substance byproducts in the LPU including engineering controls, the use of personal protective equipment and hygiene practices; containment strategies and control measures.

f. Waste minimization plan, including a program to reduce the volume and toxicity of hazardous substance byproducts in the LPU and procedures governing laboratory clean-outs.

g. The organization's system for conducting periodic chemical inventories to minimize the collection of unused hazardous substances and for conducting laboratory clean-outs.

h. Procedures relevant to the timely removal of hazardous substance byproducts from the LPU for the purpose of waste determination, reuse, recycling or disposal, including labeling of all such substances, quantity accumulation thresholds and time limits. Under no circumstance, shall a hazardous substance byproduct exceed a total of 55 gallons, nor shall it remain in the LPU in excess of 30 days, unless further storage is required as archival samples.

i. A requirement that fume hoods and other protective or control equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment

j. Emergency preparedness and response procedures, including facility and locality information, evacuation, notification, response management , incident documentation and training.

k. Provisions for information and training, as defined elsewhere in this document

l. The circumstances under which a particular LPU operation, procedure or activity shall require prior approval from the organization's environmental professional staff or its designee.

o. Designation of personnel responsible for implementation of the Environmental Management Plan, including the assignment of an Environmental Management Officer

p. Provisions for the transportation of hazardous substance byproducts to a central accumulation area for waste determination

q. Procedures for auditing and self-inspection to assess conformance with the requirements of the Environmental Management Plan

r. Procedures for the identification of EMS nonconformances, the development of action plans and assignment of responsibility and timelines for the prompt remedy of such nonconformances to prevent their reoccurrence.

s. Procedures governing benchtop and small-scale treatment to reduce the quantity and hazardous properties of hazardous substance byproducts under prescribed, approved conditions.

t. Recordkeeping requirements

E. Information and Training

The organization shall provide laboratory workers with information and training to ensure that they are apprised of the relevant elements of the Environmental Management Plan

1. Such information shall be provided at the time of a laboratory worker's initial assignment to a work area where hazardous substance byproducts may exist. The frequency of refresher information and training shall be determined by the organization.

2. Laboratory workers shall be informed of:

a) The contents of this standard and its appendices
b) The location and availability of the organization's Environmental Management Plan
c) Emergency response measures
d) Signs and indicators of a hazardous substance release
e) The location and availability of known reference material relevant to implementation of the Environmental Management Plan
f) Training requirements

3. Laboratory Worker training shall include:

a) Methods and observations that may be used to detect the presence or release of a hazardous substance (such as monitoring conducted by the organization, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released)

b) The hazards associated with hazardous substance byproducts in the work area

c) The measures employees can take to protect human health and the environment

d) Applicable details of the Environmental Management Plan

4. Non-laboratory workers present in the LPU shall be informed of:

a) The existence and location of the Environmental Management Plan
b) Relevant policies, procedures or work practices to ensure conformance to the requirements of the Environmental Management Plan