

# **UNIVERSITY OF KANSAS**

## **LAWRENCE CAMPUS**

### **LABORATORY SAFETY MANUAL**

**PREPARED BY:**

Laboratory Safety Committee  
&  
Department of Environment, Health & Safety

Revised November 2000

# The University of Kansas - Lawrence Campus Laboratory Safety Manual

## Components of the Manual

KU - Lawrence Campus Health and Safety Policy ..... iii

KU- Lawrence Campus Emergency Assistance Information ..... iv

KU-Lawrence Campus Laboratory Safety Committee. .... v

Glossary of Terms .....Glossary - pages 1 through 21

Part I : General Laboratory Safety Plan ..... I:Chapters 1 through 8 including appendices

Part II : Chemical Hygiene/Safety Plan.....II:Chapters 1 through 8 including appendices

Part III : Biosafety Plan ..... III:Chapters 1 through 8 including appendices

Part IV : Radiation (Ionizing) Safety Plan .....IV:Chapters 1 through 13 plus appendices

Part V : Laser Safety Plan .....V:Chapter 1 through 8 including appendices

## The University of Kansas - Lawrence Campus

### Health and Safety Policy

It is the policy of the University of Kansas-Lawrence to conduct all educational, research and campus activities safely and in a manner that protects the health of employees, students, and the public.

Each administrator is committed to the enforcement of the health and safety policies of the University and to promulgating appropriate safety practices within his or her area of responsibility.

All faculty members and others involved in instructional and/or research programs are responsible for seeing that the students in their courses and laboratories are properly trained and educated about applicable safety and health policies and practices prior to exposure to instructional or research hazards.

Each employee and student is entitled to have access to information about the University's health and safety policies and practices and is responsible for knowing and adhering to health and safety policies and practices as they are applicable to the instruction, research and work settings in which he or she participates.

Each employee is responsible for maintaining a safe work place. Employees have a continuing responsibility to develop and follow practices that achieve these goals.

Each employee who manages or supervises the work of others is additionally responsible for seeing that employees and students for whom they are responsible are properly trained and educated about safety and health practices.

Each guest of the University is expected to adhere to the health and safety policies of the University while on campus.

All University-related facilities, activities, and programs shall be designed, conducted, and operated in a manner which reasonably protects human health and safety. Adherence to these principles is necessary in order for the University to achieve its mission of providing quality instruction, research, and services.

The University strives to provide training and education conducive to the establishment and maintenance of safe educational, research and work environments.

# The University of Kansas - Lawrence Campus

## Emergency Assistance Information

### **EMERGENCY – 911**

#### KU Public Safety (KU-PS)

- Emergency -- 911
- Non-emergency -- 864-5900

#### KU Environment, Health & Safety (KU-EHS)

- Daytime Emergencies (M-F, 8:00 am - 5:00 pm) -- 864-4089
- EHS Emergency On-Call Pager (24 hrs/day, 7 days/week) -- 838-7421

#### KU Facilities Operations (KU-FO)

- Daytime Emergency Maintenance (M-F, 7:30 am - 5:00 pm) --864-4770
- After Hours/Weekend Emergency Maintenance -- 864-5900

### **Routine Assistance Contacts**

For Routine Assistance Contacts Go To EHS Website:

EHS Emergency Info Page <http://www.ehs.ku.edu/emergency1.html>

# The University of Kansas - Lawrence Campus Laboratory Safety Committee

For Current Membership Roster Go To EHS Website:

<http://www.ehs.ku.edu/documents/ehscmembers1.html>

# University of Kansas Laboratory Safety Manual

## GLOSSARY

### Access

Access to laboratories with hazardous materials/radiations may be restricted to individuals with specific types of training. The Laboratory Entrance Posting (LEP) shall indicate who is permitted to enter without personal supervision by a properly trained individual. See also “restricted access.”

Access Restrictions See Restricted Access.

### Action Levels

Defined hazardous conditions or situations which “trigger” a specified and formal corrective action usually requiring documentation. Frequency of occurrence of a hazardous condition/situation and the severity of the hazard are the factors determining the level of the required response to the “trigger.” In many cases, there are graded action levels associated with the same type of hazardous condition/situation.

### Administration

The person, people, or collective group responsible for managing all aspects of the University. The Chancellor has ultimate responsibility and authority for the entire KU system. At the KU-Lawrence campus, the Provost has responsibility and authority. The KU-Lawrence campus administrative team is made up of the Provost, Associate Provosts, Assistant Provosts, and Vice Chancellors.

### Administrative Controls

Procedures designed for the safe conduct of any proposed work with Hazardous Materials/radiations. It includes all university-wide and laboratory-specific standard operating procedures in addition to any other adopted procedures. Control of the equipment/materials is achieved by the on-going actions of individuals as they work with or near the Hazardous Materials/Radiation Generating Equipment.

As Low as Reasonably Achievable (ALARA)

The phrase or acronym which states the overall governing safety principle or philosophy that exposures to hazardous materials (HM)/radiations or risks from physical hazards shall be kept "as low as reasonably achievable." It defines "prudent practice" and is the ethical goal of the safety program. Since this term has been adapted from the world of ionizing radiation safety, the definition given in 10 CFR 20.1003 is included here. ALARA means "making every reasonable effort to maintain exposures to radiation (HM)/risks as far below (established dose/risk limits) as is practical consistent with the purpose for which the ... activity... is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of ...(the proposed activity)...in the public interest." (Items in parentheses are substitutions for words like "nuclear energy," "licensed materials," etc.)

Authorization See EHS Safety Authorization

Authorized Laboratory (AL)

An area or room that has been approved for the use of hazardous materials and/or sources of radiation by the procedures required in this Laboratory Safety Plan. Note: In some cases, approval is required only at the level of the unit director ~~and~~; in other cases, approval by designated committees and/or EHS is required.

Authorized Laboratory Supervisor (ALS)

A person who is responsible for a "laboratory" (see definition below) and has the necessary authorizations/permits to carry out the activities associated with his/her laboratory. Note: An ALS must also be an Authorized User (see definition below) for the level of activities the ALS performs in the laboratory.

### Authorized Occupant (AO)

An individual who requires unsupervised access or presence in an area or laboratory in which hazardous materials are being used and/or hazardous radiations are being produced, who does not work with or handle these hazardous materials or sources of radiation but who has received all of the documented training necessary to avoid the hazards associated with the area or room.

Examples are Housekeeping personnel, Facilities Operations personnel, Office personnel, Security personnel, and Laboratory personnel/students/guests who do not use and are not trained to use or handle all of the hazardous materials and/or sources or radiation in the area.

Note: Laboratory personnel/students/guests will very often be an Authorized User for certain limited number of materials and be an AO with respect to other materials/hazards.

### Authorized User (AU)

An individual who has all of the documented training and experience required by this plan for the use of the hazardous materials and/or sources of radiation applicable to the activities in which the user is engaged.

Note: There are many types and levels of training specified by this plan. The requirements are commensurate with the type and levels of hazards involved in those activities. In some instances in this plan an adjective will be inserted as appropriate--for example, Authorized Radiation User, Authorized Laser User etc to specify a limitation to a particular type of user.

Note: For legal purposes it shall be understood that "Authorized User" is synonymous with "Radiation Worker" for purposes of ionizing radiation safety.

### Biohazard

Any biological material (e.g., plants, animals, microorganisms, or their by-products) that may present a potential risk to the health and well-being of humans, animals or the environment.

### Biohazard Decontamination

The use of physical or chemical means to remove, inactivate, or destroy pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the item or surface is rendered safe, (no longer a biohazard) for handling, use, or disposal.

### Biohazard Waste

Any biohazard to be disposed of (liquid, semi-liquid, or solid waste) which may contain potentially infectious agents that could cause disease or injury to humans or animals should they come in contact with the waste. This includes: contaminated items that would, if compressed, release blood or other potentially infectious materials in a liquid or semi-liquid state; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; pathological, microbiological, laboratory and any other wastes containing blood or other potentially infectious materials. (EXCEPTIONS: Any biological material which exhibits radioactivity or is mixed with chemicals shall be handled in accordance with applicable Radiation Procedures or Hazardous Waste Procedures.)

### Bloodborne Pathogens

Pathogenic microorganisms that are present in blood (human or animal) and that can cause disease in humans or animals.

Carcinogen See also related items -- Particularly Toxic Chemicals and Select Carcinogens.

Cancer-causing agent.

### Caution

Typically used as a header on hazard warning signage to indicate that a hazard is present, which if not avoided, could result in moderate or minor injury. OSHA requires its use to caution employees against potential hazards or unsafe practices. Caution signs shall have a yellow background, with the word caution spelled out in yellow letters on a black panel.

### Combustible Liquids

Any liquid having a flashpoint at or above 100°F (37.8°C), but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F (93.3°C) or higher, where the volume of such components make up 99% or more of the total volume of the mixture.

### Compressed Gas

- (1) a gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C); or
- (2) a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F (21.1°C); or
- (3) a liquid having a vapor pressure exceeding 40 psi at 100°F (37.8°C) as determined by ASTM D-323-72.

### Contaminated or Contamination

For the purpose of this program, means the presence or reasonably anticipated presence of blood or other Hazardous Materials on an item or surface or in the air. If "contamination" is preceded by a prefix of "biohazard," "hazardous chemical," or "radioactive," the contamination is restricted to that specific hazard class. Contamination is the presence of unwanted and unneeded hazardous materials on any surface or in the air.

### Contaminated Sharps

Any contaminated object that can penetrate the skin including, but not limited to: needles, scalpels, broken glass, broken capillary tubes, and any other objects capable of skin penetration which may be contaminated.

### Corrosives

Materials which are health hazards and chemically react at the point of contact to cause immediate, acute erosive effects (often visible burn-like damage) to tissues (strong acids, strong alkali, organic & inorganic halides, etc.). OSHA defines "corrosives" as chemicals that cause visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

Danger See also related terms--Imminent Danger, Serious and Minor Noncompliance.

Typically used as a header on hazard warning signage to indicate that an imminently hazardous situation is present, which if not avoided, could result in death or serious injury. When used on hazard warning signage, this signal word is to be limited to the most extreme situations. Danger signs shall have a white background with the letters danger spelled out in white surrounded by red on a black panel.

Decontamination

Procedures designed to reduce contamination (see contamination) to acceptable levels --preferably the elimination of contamination.-

Department of Environment, Health and Safety (EHS)

The administrative support unit under the Associate Provost for Support Services at the University of Kansas - Lawrence Campus that is responsible for administering the campus environment, health & safety program

Departmental Safety Coordinator (DSC) See Unit Safety Coordinator

Designated Area

An area which must be used for working with "EHS Safety Authorization-Requiring Hazardous Materials/Radiation Generating Devices." A designated area may be an entire laboratory, a specific area within the laboratory, or a designated device such as a laboratory fume hood, biosafety cabinet, glovebox, etc.

EHS See Department of Environment, Health and Safety.

EHS Safety Authorization

Laboratories are not permitted to work at a Level III or IV hazard class (see Laboratory Hazard Class) until an EHS-approved Laboratory-Specific Safety Plan (LSSP) (see Laboratory-Specific Safety Plan) has been established by the laboratory **and** the EHS has verified by inspection and/or review that all the conditions stipulated in the LSSP have been met. Upon a satisfactory review, the EHS will issue a written Safety Authorization upon which the laboratory may begin work at the assigned Level.

EHS Safety Authorization-Requiring Hazardous Materials/Radiation Generating Devices

These are materials or equipment which, when used in a laboratory, create a Laboratory with a Hazard Class of Level III or IV (see Laboratory Hazard Class). Laboratories planning to use such materials shall obtain a written EHS-Safety Authorization (see EHS Safety Authorization) **before** initiating use of such materials or equipment.

### EHS Safety Authorization - Requiring Biohazards

Biohazards listed as level 3 or 4 in the CDC manual and CDC restricted agents require review and approval of the laboratory-specific safety plan and procedures (permit) by the EHS Dept. and the Biosafety subcommittee of the Laboratory Safety Committee before they can be acquired or used.

### EHS Safety Authorization - Requiring Hazardous Chemicals

Certain chemicals and/or quantities of chemicals which require a specific review and approval of the laboratory-specific safety plan and procedures (permit) by the EHS Dept. and, in some cases, by the Chemical Safety subcommittee of the Laboratory Safety Committee before they can be acquired and used.

### EHS Safety Authorization - Requiring Hazardous Lasers

Lasers/Laser Systems of Class II, IIIa, IIIb or IV require a specific review and approval of the laboratory-specific safety plan and procedures (permit) by the EHS Dept. and, in some cases, by the Laser Safety subcommittee of the Laboratory Safety Committee before they can be acquired and used.

### EHS Safety Authorization - Requiring Hazardous Radiations

All Radioactive Materials and/or Radiation Generating Devices require a specific review and approval of the laboratory-specific safety plan and procedures (permit) by the EHS Dept. and, in some cases, by the Radiation Safety subcommittee of the Laboratory Safety Committee before they can be acquired and used.

### Emergency

An unexpected, serious occurrence or situation urgently requiring prompt action. In the laboratory, emergencies can result from hazardous materials spills/releases, malfunctioning equipment, fire, and/or personal injury/ need for medical assistance, etc.:

Employee's Health and Safety Manual See University Safety & Health Manual.

### Engineering Controls or Engineered Controls

These are hazard control methods which are used to reduce or prevent exposures to individuals by focusing on controlling the source of potential contamination, the work environment, or worker contact through engineering means such as:

- 1) Design Stage Engineering -- integrating safety into an operation or process from the very start by performing proper analysis of proposed activities to identify potential hazards and including hazard control measures in the "design" of the process.
- 2) Substitution -- replacement of hazardous equipment, materials or processes with less hazardous ones.
- 3) Isolation -- putting a protective physical barrier between the hazardous equipment, materials, or processes and those who may be affected by the hazards.
- 4) Ventilation -- mechanical removal of air to control, reduce, and remove potential airborne hazards/contamination.

Environment, Health and Safety (EHS) See Department of Environment, Health and Safety.

### Explosives

Solid, liquid or gaseous chemicals that can cause a sudden, almost instantaneous release of pressure, gas, and heat when subjected to shock, pressure, or high temperature. Explosives are permit-requiring chemicals.

### Flammable Gas

A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% by volume or less; or a gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air greater than 12% by volume, regardless of the lower limit.

### Flammable Liquids

Any liquid having a flashpoint below 100°F (37.8° C), except any mixture having components with flashpoints of 100°F (37.8° C) or higher, where the volume of such components make up 99% or more of the total volume of the mixture.

Flammable Solid

A solid material, other than a blasting agent or explosive, that is liable to cause a fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from processing, or which can be readily ignited and burns vigorously and persistently as to create a serious hazard.

Flashpoint

The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture with air and produce a flame when a source of ignition is present.

Guests

Any unpaid but invited individuals (not KU personnel or KU students) who do unsupervised work (or plan to do unsupervised work) in the laboratory with hazardous materials/radiation generating devices, that are part of the function of that laboratory, and that are directly responsible to the Authorized Laboratory Supervisor for their activities. Examples include short term visiting scientists or students. Note: All guests are expected to become either Authorized Users or Authorized Occupants or both if they are to have unsupervised access to the lab.

Hazard Communication

The content of the specific information on hazards that shall be furnished to a prospective authorized user before use of the hazardous materials/radiations or to a prospective authorized occupant before unsupervised occupancy is permitted in areas in which hazardous materials/radiations are present.

Hazard Level See Laboratory Hazard Class

Hazardous Biological Agent See Biohazard.

Hazardous Chemical

Any chemical with one or more of the following properties:

1) Physical Hazards: Combustible Liquid, Compressed Gas, Explosive, Flammable Liquid, Flammable Solid, Organic Peroxide, Oxidizer, Pyrophoric, Unstable, or Water Reactive.

2) Health Hazards: Carcinogens, Corrosives, Irritants, Sensitizers, Toxic or Highly Toxic Agents, Reproductive Toxins, Hepatotoxins, Nephrotoxins, Neurotoxins, Hematopoetic System Agents, Agents which can damage the eyes, skin, lungs or mucous membranes.

3) EXCEPTIONS - chemicals to which this definition as used in this Plan does not apply:

a) Food, drugs, cosmetics or alcoholic beverages packaged for sale to consumers, or intended for personal consumption by employees in the workplace.

b) Any chemical consumer product where it can be demonstrated that it is used in the laboratory in the same manner as normal consumer use, and the use results in a duration and frequency of exposure which is not greater than normal consumer exposure.

c) Any drug (as defined by the Federal Food, Drug, and Cosmetic Act) that is used in its final form for direct administration to a patient.

Hazard Class See Laboratory Hazard Class.

Hazardous Materials

Any material containing one or more of the following: Biohazard, Hazardous Chemical, or Radioactive Material See the individual definitions in this glossary.

Hazardous Radiations

Any ionizing radiation or laser beams potentially or actually emitted from a radiation generating device (RGD) or radioactive material. Note: In this Plan other radiations such as microwaves are not yet addressed. In this Plan, when “hazardous radiations” are referenced, the reference is to equipment which is energized and producing hazardous radiations or to radioactive materials emitting external fields of ionizing radiation.

Health & Safety Policy See Safety & Health Policy.

### Imminent Danger

Any situation in the laboratory which could reasonably be expected to cause death, serious injury or illness, or significant risk to the environment.

### Labels

Labels must be maintained on containers of hazardous materials which identify the content, the hazard, name of the manufacturer, importer or other responsible party, and, as applicable, the appropriate specified hazard warning symbol or sign.

### Laboratory

Any campus area (room or area outdoors) where the laboratory use of hazardous materials and/or sources of hazardous radiations is present (see definition below) and which is used for research or teaching purposes or in direct support of such research or teaching activities. (Examples: chemical or biological storerooms for research laboratories or classrooms, shops directly used for support in such activities, studios, "prep" or "syntheses" facilities, etc.)

There is one important exception of the restriction of the word "laboratory" to research and classroom related activities. Any use of radioactive materials or of Radiation Generating Devices by any one on campus is included under this definition of "laboratory" without exception and is subject to the Laboratory Safety Program.

### Laboratory Entrance Posting (LEP)

Each laboratory in which hazardous materials/radiation generating equipment or materials are present shall have an EHS approved entrance posting which identifies the hazards present, specifies access restrictions, if any, and the name and phone number of the authorized supervisor and one or more designated EHS-approved alternate.

### Laboratory Hazard Class

All laboratories with hazardous materials (HM) or radiation generating devices (RGD's) must be assigned by EHS a hazard class ranging from Level I to Level IV and be posted as such. Level IV labs are those with the highest levels of potential health risks. The classification will be assigned on the basis of the types of hazards, level of hazards, and complexity of operations in that laboratory. CDC-defined Level 3 and 4 biohazards will require Level III and IV labs respectively at KU, and the former Category A, B and C laboratories with radioactive materials will respectively require Level IV, III and II designations. The use of EHS Safety Authorization - Requiring Hazardous Materials (see definition) would fall into either Level III or IV classifications with the exception of radioactive materials. The use of any radioactive materials requires a permit (Safety Authorization) and this includes Level I and II laboratories.

### Lab Hazard Registration/Safety Authorization Application (LHRSAA)

A form (Appendix 8.3.1 of Part I) that is used to identify hazards in the laboratory and to initiate the process by which additional safety requirements are put into place for a given laboratory if the level of the hazard requires such additional safety requirements. This form should be used by the Laboratory Supervisor to assess the need for safety procedures and controls and is used to inform the EHS of the hazards that are present in the laboratory and to create the appropriate Laboratory Entrance Posting (LEP). It also serves to initiate the process for obtaining an EHS Safety Authorization (see EHS Safety Authorization) if a laboratory is planning operations which would be classified at a Level III or IV Laboratory Hazard Class (see Laboratory Hazard Class and/or Level I, II, III, or IV Laboratories).

### Laboratory Occupants

Individuals who need unsupervised access or presence in an area or laboratory in which hazardous materials are being used and/or hazardous radiations are being produced, who do not plan to work or handle these hazardous materials or sources of radiation, but who need to become an Authorized Occupant (see definition above). This category also includes those who are already Authorized Occupants. (All actual and prospective occupants are included). Examples are Laboratory personnel/students/guests (see definition of guests above) who do not use and are not (will not be) trained to use or handle all of the hazardous materials and/or sources of radiation in the area. Note: All laboratory occupants shall become Authorized Occupants.

### Laboratory Personnel

Any individuals who work in the laboratory with activities that are part of the function of that laboratory and are directly responsible to the Authorized Laboratory Supervisor for their activities and who are employees of the University. This includes, for example, students on the pay roll, research assistants, post-docs, and laboratory technicians.

### Laboratory Safety Committee

The Provost-appointed Lawrence campus committee (under the Environment, Health and Safety Council) responsible, with the assistance of the EHS, for the development and maintenance of the campus-wide laboratory safety program. It has four subcommittees which respectively are responsible for Chemical Hygiene/Safety, Biosafety, (Ionizing) Radiation Safety, and Laser Safety.

### Laboratory Scale

Any 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. It also includes work with sources of hazardous radiations at the research or classroom level.

### Laboratory-Specific Safety Plan (LSSP)

Laboratories that are classified at the Level III or IV hazard class (see Laboratory Hazard Class) are required to develop a written laboratory-specific safety plan which evaluates the need for and specifies safety requirements that go beyond those provided in the KU Laboratory Safety Manual. These include an evaluation of the need for engineered safety features and for additional Standard Operating Procedure (SOP's).— The proposed Laboratory-Specific Safety Plan has to be submitted to the EHS for review and approval. At Level III, only EHS approval is needed and, at Level IV, approval by the EHS and the appropriate subcommittee of the University Laboratory Safety Committee is needed.

### Laboratory Users

Any individuals who work (or expect to work) in the laboratory with activities that involve handling of hazardous materials/radiation generating devices, that are part of the function of that laboratory, and that are directly responsible to the Authorized Laboratory Supervisor for their activities. This includes, for example, paid or unpaid students, research assistants, post-docs, guests (see definition above) and laboratory technicians. Note: All laboratory users shall become Authorized Users.

Laboratory Use of Hazardous Materials and/or Sources of Radiation

Any handling or use of such materials/sources in which all of the following conditions are met:

- a) Manipulations of Hazardous Materials/Sources are carried out on a "Laboratory Scale".
- b) Multiple procedures or hazardous materials/sources are used.
- c) The procedures involved are not part of a production process, nor in any way simulate a production process.
- d) Protective laboratory practices and equipment are available and in common use to minimize the potential for laboratory user/occupant/visitor exposure to hazardous materials/sources.

Lasers

The laser safety procedures specified in this Plan are applicable to all types of equipment which generate external beams of lasers or which are accessed during maintenance or modification by university personnel in such a fashion that an external beam of lasers is possible. (Lasers in equipment such as copiers, printers, etc which are not serviced by university personnel and which remain entirely enclosed are not covered under this Plan.)

LEP See Laboratory Entrance Posting

Level I, II, III or IV Laboratories See Laboratory Hazard Class.

Level of Hazards See Laboratory Hazard Class.

LHRSAA See Lab Hazard Registration/Safety Authorization Application.

LSSP See Laboratory-Specific Safety Plan.

### Materials Safety Data Sheets (also known as "MSDS")

Hazard information which chemical manufacturers, importers, and distributors are required to submit with the initial shipment of a chemical or when the information is updated. It contains detailed information about the chemical such as: product identity, chemical and common name(s), physical and chemical characteristics, physical and health hazards, employee exposure information, general precautions for safe handling and use, generally applicable control measures, emergency and first-aid procedures and other pertinent information. Federal and state regulations require that copies of the MSDS for each hazardous chemical present must be readily available to personnel in their work area.

### Medical Consultation

A consultation which takes place between a laboratory person and EHS or a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous material may have taken place.

### Minor Non-Compliance

Any non-compliance act, condition or situation not included under imminent danger or serious non-compliance. (See definitions of the latter two.)

MSDS See Material Safety Data Sheets

Non-compliance See also Minor Non-Compliance, Serious Non-Compliance and Imminent Danger.

Any act, condition or situation not meeting the requirements of federal, state, or local regulations, this Laboratory Safety Program, or the University's Safety & Health Manual.

### "Non-Contaminated" or "Un-contaminated" items

Generally, an item which is not contaminated with Hazardous Materials (any type) or not contaminated with specified HM in some cases..

### Organic Peroxide

An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

### Other Potentially Infectious Materials

Any biological fluids; carcasses; unfixed biological tissues or organs; cell, tissue, or organ cultures, media or solutions; containing infectious agents capable of causing disease or injury to humans, animals, or plants should they come in contact with it.

### Oxidizer

A chemical other than a blasting agent or explosive (as defined earlier) that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

### Particularly Toxic Chemicals

Materials which are identified as “select carcinogens,” “reproductive toxins,” or “chemicals with acute toxicity or moderate to high chronic toxicity.” These are EHS safety authorization-requiring hazardous chemicals.

### Pathogen

Any microorganism capable of causing disease.

Permissible Exposure Limits See related topic--Threshold Limit Values (TLV's).

A permissible exposure limit is a concentration of a hazardous material, usually based on an eight hour time weighted average, that a person may not be exposed above without special safety protective equipment or engineering controls in place. Permissible exposure limits to chemicals, biohazards, and/or radiations are established by federal, state, or local regulations.

### Permit

The term that is used for required EHS-approved Laboratory-Specific Safety Plans involving the use of radioactive materials and/or other sources of ionizing radiation. At the present time, “permit” is the term used in the Kansas Radioactive Materials License.

### Personal Protective Equipment (PPE)

Personal apparel and/or devices which provide some degree of protection from safety and health hazards.

### Pyrophoric

A chemical that will ignite spontaneously in air at or below a temperature of 130°F (54.4°C).

### Radiation Generating Device (RGD)

Any equipment or device which may produce external ionizing radiation fields or laser beams. RGD's designed for the purpose of producing ionizing radiations require Radiation Safety Committee-approved permits. (TV's, monitors and other such household appliances are not included in this definition.)

### Radioactive Material(RM)

Any substance or mixture of substances that contains unstable nuclei which emit ionizing radiations of any type.

Note 1: Because of regulatory requirements, all radioactive materials are Permit-Requiring Hazardous Materials.

Note 2: Usually "natural radioactive materials" as they appear in soil or other natural products are not included but there are exceptions when such materials have been technologically enhanced to contain higher concentrations of such materials.

### Reactives

Any solid, liquid, or gaseous chemical substance which are flammable solids, or have the potential to react rapidly so as to release relatively large amounts of energy and/or dangerous by-products (i.e. a toxic gas). This includes flammable solids, pyrophorics, oxidizers, organic peroxides, unstable reactives, water reactives, peroxidizables and potentially explosive compounds.

Registration See Lab Hazard Registration/Safety Authorization Application (LHRSAA)

### Reproductive Toxins

Chemicals which affect reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Restricted Access See also Laboratory Entrance Posting.

Laboratories with hazardous materials/radiations may have to restrict access to specifically qualified individuals and exclude unsupervised access to all other individuals. The nature of such restrictions shall be posted at the entrance on the "Laboratory Entrance Posting."

Safety Authorization See EHS Safety Authorization.

#### Safety Data Sheets

For hazardous materials which do not have official "Materials Safety Data Sheets", the EHS Dept., in consultation with the laboratory supervisor if necessary, will create KU-specific safety data sheets which provide relevant safety information.

#### Safety and Health Policy (University)

The one page safety and health policy statement jointly issued by the Chancellor and the Provost which mandates the maintenance of a safe and healthy environment for individuals frequenting the Lawrence campus.

#### Select Carcinogens

These fall under the heading of particularly toxic chemicals and require an EHS Safety Authorization. Any substance which meets one of the following criteria is considered to be a select carcinogen and a particularly toxic chemical:

- a) It is regulated by OSHA as a carcinogen; or
- b) It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP-latest edition); or
- c) It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be either a group 1 carcinogen or a group 2a or 2b potential carcinogen.

#### Serious Non-Compliance

Any situations or actions in the laboratory in which the non-compliance creates a condition where the capability to protect an individual(s) from safety and health hazards is compromised, or in which the capability of keeping exposures below applicable exposure limits has been compromised.

Serious Violation See Serious Non-Compliance.

### Shall

All components of this plan that are introduced with this term are mandatory for the subjects preceding the "shall." Failure to follow the procedures specified by a "shall" is non-compliance with this plan.

### "Sharps"

Any sharp objects which could readily puncture or cut the skin of an individual when accidentally encountered.

### Should

Introduces procedures which are very highly recommended but are not considered "non-compliance" if alternative standards are adopted for very good reasons. For specific laboratories, the unit SOP's may elevate a "should" to a "shall."

SOP's See Standard Operating Procedures.

### Sources of Radiation

Any equipment and/or materials from which external fields or beams of ionizing radiation or laser beams are emitted. Examples--X-ray Units of all types, gamma cells, lasers etc.

### Standard Operating Procedures (SOP's)

The safety procedures that shall or should (as specified) be followed in order to ensure reasonable safety in the use of hazardous materials/radiations. (These include laboratory-specific SOP's in addition to those specified in this Plan and in the University's Health and Safety Manual.)

### Stop Work Order

A verbal or written order by the EHS mandating cessation of all activities in a specified laboratory until the imminent danger or serious violation in the laboratory has been eliminated by appropriate corrective action. Laboratory Safety Committee approval is required before activities may be resumed after a Stop Work Order has been issued.

### Training

All individuals who have unsupervised access to laboratories with hazardous materials/radiations shall have documented training appropriate to that individual's responsibilities in that laboratory before such access is exercised.

### Threshold Limit Values

A personnel exposure limit based upon a time-weighted average concentration under which most people can work consistently for 8 hours a day, day after day, with no harmful effects from the exposure. These are recommended exposure limits developed by various professional safety and health associations and often adopted for use. These are not legally enforceable limits like a permissible exposure limit, but can be identified as prudent practice safety precautions.

### Unit

Any administrative entity with a laboratory or laboratories for which it is has the responsibility for the health and safety of the individual is a "unit". (There are levels of "units". Each laboratory with a supervisor is a unit. An academic department is a unit which may have many "lower level units" under it.)

### Unit Safety Coordinator (USC)

An Authorized User who has been designated to perform certain safety functions within the department or unit for the administrative head of that department or unit. Laboratories (Units) or Departments with hazardous chemicals, hazardous biological agents, radioactive materials/radiation sources, and/or lasers are required to have designated USC or USC's to cover all types of hazards present. Unless or until the Authorized Laboratory Supervisor appoints a Unit Safety Coordinator, he or she has that role by default. The USC must be an Authorized User for all of the hazards for which he/she has responsibility.

### University Safety & Health Manual

The KU-Lawrence Campus manual which specifies the university-wide safety practices applicable to all faculty and staff members, students, and visitors on the Lawrence campus. The manual is also applicable in the laboratory setting. The requirements of the Laboratory Safety Program/Plan are in addition to the those of the University Safety & Health Manual.

University Health and Safety Policy See Health and Safety Policy

### Unstable Reactive

A chemical in its pure state, or as produced or transported, which will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure, or temperature.

Violation See Non-Compliance

### Visitor

Any individual present in an area or room in which hazardous materials/radiations are being used who is not an Authorized Occupant or Authorized User. Such an individual must be under the direct physical supervision of a qualified Authorized User or Authorized Laboratory Supervisor who has the responsibility of informing the visitor of the nature of the hazards and of ensuring that the visitor will not be exposed to hazardous materials and/or radiations at levels that are greater than those permitted for members of the general public.

### Waste

In the general sense, defined as any material (non-hazardous or hazardous) which has served its purpose, is no longer wanted and is intended to be discarded. Every material should be evaluated as to its potential recycling (reuse, redistribution, or reclamation) before being discarded.

Normal solid waste such as: paper, cardboard, plastics, metals, glass, dirt, sand, food, garbage, refuse, etc. which is FREE FROM ANY HAZARDOUS COMPONENTS or RESIDUE, may be recycled if feasible, or disposed of into normal trash baskets or dumpsters.

Any materials which are identified as being hazardous or which are contaminated with hazardous residue; when they become waste; must be collected and given to EHS for evaluation as to their potential recycling or need for special waste disposal.

### Waste Minimization & Reduction

Methods, practices and procedures developed and implemented to prevent and reduce the amount of waste being generated and needing disposal.

### Water Reactive

A chemical that reacts with water and will either ignite and burn or will release a gas that is either flammable or a health hazard.