

**BLUEFIELD STATE COLLEGE
BOARD OF GOVERNORS
POLICY NO. 46**

TITLE: CHEMICAL HYGIENE

SECTION 1. GENERAL

- 1.1 Scope: The School of Arts and Sciences of Bluefield State College (BSC) has developed this policy to meet the requirements of the Occupational Health & Safety Administration (OSHA) regulation 29 CFR 1910.1450; Occupational Exposure to Hazardous Chemicals in the Laboratories, promulgated January 31, 1990. This regulation is known as the OSHA Lab Standard and is used to protect employees from health hazards and from over-exposure to hazardous chemicals. This policy will cover all institutional academic and senior research laboratories. Any research laboratories not covered by this policy are under the oversight of the Institutional Review Board and Animal Care Committee.
- 1.2 Definitions: Hazardous chemical: A chemical for which there is statistically significant evidence, based upon at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees (OSHA Lab Standard). Laboratory (lab): OSHA defines a laboratory (lab) as a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis. Employee: An employee is defined by the lab standard as anyone employed in a lab workplace that may be exposed to hazardous chemicals in the course of his or her assignments. Because Bluefield State College is an education facility, this employee definition does cover students, as well as faculty and staff personnel.
- 1.3 Effective Date: August 31, 2007

SECTION 2. POLICY

- 2.1 Chemical Hygiene Responsibilities
Everyone at BSC is responsible for the safety of students, faculty, and staff personnel. The following is a list of positions at BSC, with responsibilities defined:
- 2.2 President of Bluefield State College
The President has the ultimate responsibility for health and safety for faculty, staff, and students. The President, Vice Presidents, and other administrators provide continuing support of the Chemical Hygiene Policy.
- 2.3 Dean of the School of Arts and Sciences
- 2.3.1 The Dean has the responsibility of supporting and enforcing the Chemical Hygiene Policy for the School, and has responsibility for all students, faculty, and staff engaged in work in the lab. Anyone who fails to comply with the lab safety rules is subject to discipline in accordance with appropriate College policies.

2.3.2 The Dean provides support for the Chemical Hygiene Officer (CHO). The Dean also allows for a budget item for safety equipment and training to support the Chemical Hygiene Policy.

2.4 Chemical Hygiene Officer (CHO)

2.4.1 The CHO is defined in the OSHA Lab Standard as an essential position for implementing and maintaining the Chemical Hygiene Policy.

2.4.2 The CHO is aware of all local, state, and federal regulations concerning the safety for all personnel, including hazardous waste disposal and personal protective equipment requirements.

2.4.3 The CHO monitors the procurement, use, and disposal of hazardous chemicals.

2.4.4 The CHO sets up training for all faculty and staff as needed.

2.4.5 The CHO maintains copies of the Material Safety Data Sheets for all chemicals used in science labs across campus.

2.4.6 The CHO participates on the BSC Safety Committee.

2.4.7 The CHO seeks ways to improve the Chemical Hygiene Policy and provides the information to the Safety Committee.

2.4.8 The CHO procures safety equipment and supplies.

2.4.9 The CHO is the first person to be called when there is an accident or a chemical spill, unless the accident is a life threatening emergency. In such cases, 8-911 should be called first.

2.4.10 The CHO maintains safety training records.

2.4.11 The CHO will receive documentation from faculty, staff, or students about the research or instructional lab experiment changes or the implementation of new procedures and/or lab experiments.

2.4.12 The CHO performs routine tests of safety equipment; results are maintained in a log book.

2.4.13 The CHO maintains a safety publication library for review by all interested parties.

2.4.14 The CHO maintains all medical reports and physicians opinions concerning accidents or overexposure incidents that might occur on the campus.

2.5 Lab Instructor

2.5.1 The Lab Instructor is responsible for the safety of students during the lab instruction period and, except for emergency reasons, will remain in the lab during the scheduled lab period.

2.5.2 The Lab Instructor provides safety information to the students and assures that they understand the lab safety policies before the experiment is begun.

2.5.3 The Instructor assures that students are wearing the appropriate personal protection equipment for the experiment.

2.5.4 The Instructor ensures the Chemical Hygiene Policy (CHP) is being followed.

2.5.5 If an accident occurs, the Lab Instructor contacts the CHO, the Dean, and Public Safety. If the accident victim needs medical attention, the phone in the lab is to be used to dial 8-911 for emergency response personnel.

2.6 Safety Committee

2.6.1 The Safety Committee shall meet on a regular basis.

2.6.2 The Chemical Hygiene Policy will be reviewed annually for any changes by the Safety Committee.

2.6.3 The Chemical Hygiene Policy will be enforced by the Dean of the applicable school.

2.6.4 The Safety Committee reviews any safety violation and accident reports and makes appropriate recommendations about changes in safety procedures to the Dean.

2.6.5 The Safety Committee reviews safety inspections of the lab and chemical storage facilities provided by outside authorities such as the State Fire Marshall, State Inspector, or others.

2.6.6 The Safety Committee will routinely tour the lab and chemical storage facilities.

SECTION 3. LAB FACILITY

3.1 The lab is defined as a facility where the lab use of hazardous chemicals may occur. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis (OSHA 29 CFR 1910.1450).

3.2 The arrangement of the lab is designed so the lab is well-ventilated to avoid intake of contaminated air.

- 3.3 The lab will have a working hood for experiments with hazardous chemicals. The ventilation hoods are inspected annually by an outside vendor and records are kept by the CHO. The hoods airflow is set for 80 to 120 linear feet per minute (ACS, 1998). Experiments with hazardous chemicals beyond the hoods' capabilities should not be initiated.
- 3.4 The chemical storage rooms are well ventilated with a sprinkler system in place. The chemical storage rooms are kept locked at all times. The CHO, the Dean's Office and Physical Plant maintain the keys.
- 3.5 The safety equipment that is in place in the labs consists of an emergency eye wash, deluge shower, fire blanket, and a first aid box which is stocked by the CHO. The safety equipment is tested on a regular basis and the records are kept by the CHO.
- 3.6 Experiments that are conducted in the lab must be within the capabilities of the facility and appropriate for the educational programs of the Institution. If an experiment is changed for any reason, or if there is a new research project being planned, it will need to be submitted to the Dean for review.
- 3.7 The labs have proper storage cabinets that will contain a minimum amount of chemicals for the purpose of those labs' experiments.
- 3.8 Each lab has the proper fire extinguisher attached to the front wall by the door. The fire extinguishers are inspected annually by an outside vendor and the Physical Plant Department keeps the inspection records on file.
- 3.9 The sprinkler system is inspected annually by a fire safety vendor and the records are maintained in the Physical Plant Department.

SECTION 4. STANDARD OPERATING PROCEDURES

- 4.1 Proper handling of hazardous chemicals is to ensure that exposure by students, staff, and/or faculty members is kept to a minimum. A chemical should be deemed hazardous until the Material Safety Data Sheet (MSDS) is consulted.
 - 4.1.1 Material Safety Data Sheets are forms that come with each chemical as it is received. These data sheets contain information about the physical properties of the chemical or biological substance, disposal regulations, and recommended Personal Protection Equipment. Each lab is equipped with a copy of the MSDS for each chemical used in that lab. The MSDS should be reviewed prior to the experiment taking place. The CHO regularly checks and updates these books as needed.
 - 4.1.2 Avoid eye and skin contact; chemicals should not be smelled or tasted. If the chemical needs to be smelled, the wafting technique should be used. Vapors should not be directly inhaled.

- 4.1.3 Chemicals with a strong vapor or chemicals that are flammable must be used in the hood to prevent the user from being by vapors.
- 4.1.4 Safe and prudent lab practices, as outlined in this document, are to be followed.
- 4.1.5 Chemicals needed in the lab for the instructional period will be moved into the lab by the Lab Manager. The chemicals are not to be moved during the high traffic times such as the period between classes. The chemicals will be placed into a bottle carrier and then placed on a cart to be moved from room to room. The Lab Manager will remove the chemicals after the class time and place them in the proper storage area.
- 4.1.6 Flammable chemicals are not to be heated by flame or hot plate. Flammable chemicals are defined as liquids with a flashpoint below 100 °F and solid materials that readily sustain combustion. Liquids with a flashpoint between 100 °F and 200 °F are generally classified as combustible; the same basic procedures should be applied when handling combustible liquids (ACS, 1998).
- 4.1.7 Hands must always be washed before exiting the lab.
- 4.1.8 Chemicals used in the lab must be appropriate to the facility and appropriate to the education programs of the Institution; they should not exceed the capabilities of the exhaust system or storage capability facility.
- 4.1.9 Consumption of food or drink and the applying of cosmetics in the lab is prohibited.
- 4.1.10 Glassware that is used in the lab is not to be used for any other purpose than that of the lab experiment, i.e. drinking from beakers.
- 4.1.11 Food, beverages, and cosmetics are not to be stored in the chemical storage areas or the refrigerator labeled for chemical storage.
- 4.1.12 Pumps that may discharge chemical fumes into the room must be used in the hood. Distillation apparatuses shall be set up in the hood as well.
- 4.1.13 Observe the PEL (Permissible Exposure Limit) and TLV (Threshold Limit Value) for all chemicals that are to be used. These are found in the MSDS. The PEL is defined as the level of a contaminant in air for certain chemicals; that level is not to be exceeded. The level is specified in 29 CFR 1910.1000 (ACS, 1998). The TLV is the level of a contaminant in air to which nearly all workers can be exposed for an 8-hour day, 40 hour work week, without feeling any ill effect (ACS 1998). This standard is provided by the American Conference of Governmental Industrial Hygienists (ACGIH); OSHA is the enforcement agency for these limits.

- 4.1.14 Class demonstrations will follow the American Chemical Society's "*Minimum Safety Guidelines for Chemical Demonstrations*". The Instructor will give the CHO a copy of the demonstration plan, i.e. the chemicals used, type of apparatus needed, and the MSDS, at least two weeks in advance, and it will be reviewed by the Safety Committee. Highly toxic, flammable, and/or explosive chemicals, such as carbon tetrachloride and formaldehyde, will not be used for demonstrations. The chemicals and/or biologicals needed for the demonstration must be checked-out from the Lab Manager. Chemical demonstrations should not be shown in a classroom; they must be performed in the lab.
- 4.1.15 Chemical containers must be closed when not in use.
- 4.1.16 No student, staff or faculty member should ever pipette any substance by mouth; a pipette aid, such as a bulb, should always be used.
- 4.1.17 When concentrated acids and bases are being diluted, they should be slowly poured into the water while stirring.
- 4.1.18 Practical jokes and "horsing around" are prohibited in the lab.
- 4.1.19 Students may not work alone in a lab unless authorized by the Dean and the Safety Committee.
- 4.1.20 Chemical wastes must be properly disposed of, and should not be poured down a sink unless authorized by the Lab Instructor.
- 4.1.21 Any unsafe conditions or mechanical failures should be reported to the Lab Manager/CHO immediately.
- 4.1.22 Children and individuals not registered in the class are not allowed in the lab.
- 4.1.23 When heating a test tube or other apparatus, it should be pointed away from the user and other persons in the lab.
- 4.1.24 Hands should always be protected when cutting glass tubing. Glassware should always be lubricated with soap, glycerin, or stopcock, and greased before inserting into stoppers.
- 4.2 Housekeeping practices in the lab are important in keeping students, staff, and faculty safe from accidents.
- 4.2.1 Access to emergency equipment and exits should be kept clear of all clutter. Coats, books, and bags should not be stored on the bench top or on the floor in front of the emergency eye wash and shower.
- 4.2.2 Chemicals should never be stored on the floor.

- 4.2.3 Hoods should remain free of clutter. Chemicals should be set at least two inches from the edge to prevent spillage.
- 4.2.4 Hallways and entryways should never be used as storage areas.
- 4.2.5 All chemical bottles must be properly labeled. This includes manufacturers' labels as well as in-house labels. All labels will be checked regularly by the Lab Manager/CHO and will be replaced if damaged. The label should follow the National Fire Protection Act (NFPA) 45 standards, 2000 edition and the ANSI Z129.1 standard. If a chemical is transferred to a smaller container, the container must have the NFPA hazardous chemical classification label.
- 4.2.6 Floors must be clean at all times. Spills must be cleaned-up immediately.
- 4.2.7 Glass equipment should be checked for cracks, scratches, and breakage prior to use, especially if this glassware is to be used in heating or distillation processes (NFPA 45: 9.1.3.2).
- 4.2.8 Broken glassware is **not** to be discarded in the waste can. All broken glass, if not contaminated with a biological agent or a hazardous chemical, should be deposited in the broken glass disposal box. If the broken glass is contaminated with a biohazard, it should be deposited in the biohazard bag for proper disposal. The glassware contaminated with a hazardous chemical will must be placed in the chemical spill waste bag.
- 4.2.9 Glassware must be washed carefully at the end of class/lab time, and should not be stacked on the counter, in order to aid in prevention of cuts from glass breakage. When washing glassware, gloves should be worn to protect hands from chemical or biological residue.
- 4.2.10 Chemical hazards should be kept at least two inches from the edge of the bench tops to prevent spillage.
- 4.2.11 Equipment or lab facilities not in good working order should be reported to the Lab Manager immediately.
- 4.2.12 Unattended lab work by a student must be pre-approved by the Dean.
- 4.2.13 Lab rooms will be tidied-up at the end of each class time. This includes washing glassware and wiping down lab benches. This helps ensure the students are entering into a hazard-free work space.
- 4.2.14 Smoking is prohibited in the labs and chemical storage rooms, as well as throughout the entire building.
- 4.3 Personal Protective Equipment (PPE) is provided for all students, staff, and faculty.

4.3.1 Students, staff, and/or faculty will wear the proper Personal Protective Equipment (PPE) when handling hazardous chemicals. The CHO will maintain the PPE.

4.3.2 Chemical splash goggles are to be worn by students, staff, and faculty when working with hazardous chemicals. These goggles meet the minimum standard ANSI Z87.1-1989. If eyeglasses are being worn, goggles are to be worn over them.

4.3.3 Face shields are to be worn over the goggles if the chemical is an explosive, implosive, or poses a severe splash hazard.

4.3.4 Persons working in the lab should not wear shorts and open toed shoes in the event that a spill might occur. Persons with hair below their shoulders should tie the hair back so it will not touch flames or chemicals.

4.3.5 Gloves appropriate to the degree of hazard (check the MSDS) are to be worn at all times. The gloves should be taken off when handling pens, books, and papers. Students must wash their hands before leaving the lab classroom.

4.3.6 Disposable aprons are provided in the lab to prevent spills and splashes from affecting individuals.

4.3.7 Ear protection will be provided if a noise hazard exists. The protection will be meet OSHA 29 CFR 1910.95 "Occupational Noise Exposure".

4.3.8 Ultraviolet absorbing lenses will be worn if the wavelength is shorter than 250 nm.

4.3.9 Respirators can only be worn by OSHA certified personnel (29 CFR 1910.134)

4.3.10 Gloves, aprons, and lab coats are not to be worn outside the lab or where food is stored or consumed.

4.3.11 Synthetic fingernails are made of flammable materials, and are not to be worn in the lab.

4.3.12 Jewelry should not be worn in the lab; some chemicals can seep under the jewelry and burn the skin. Some chemicals may discolor jewelry.

4.4 Emergency Safety Equipment

4.4.1 Emergency eye washes are checked regularly by the CHO and records are maintained. The recommended length of time for flushing the eyes is 15 minutes (1998, ACS).

4.4.2 Emergency deluge showers are checked regularly by the CHO and records are maintained. Flushing time is a minimum of 15 minutes; the showers should deliver 30

gallons per minute (1998, ACS) (ANSI Z-358.1). The person who has been splashed with a chemical will be stripped of the garments affected by the spill.

4.4.3 Areas around the eye washes and showers will not be blocked. The eyewashes and showers are placed in a location accessible within 10 seconds.

4.4.4 Fire blankets are placed in each lab. These blankets are for use in dousing fires as well as for modesty for a person who has been under the emergency shower due to a chemical spill. The blankets can also be used for warmth for a shock victim.

4.4.5 Fire extinguishers are placed in each lab and these areas must be free of clutter. The fire extinguishers are inspected annually by a fire safety inspection specialist, with records maintained by the Physical Plant Department.

4.4.6 Safety plans are written for each lab, and the Instructor should explain the rules on the first day of class. The students should sign a form indicating that they have read and understand the safety and emergency rules and the consequences of not following these safety rules. The signed slips are given to the CHO. The instructor is to enforce the lab safety rules during class. The instructor has the option of removing the student from the laboratory exercise if these rules are not followed.

4.4.7 Emergency telephones are available in Basic Science rooms 203, 205, and 209. These rooms were viewed as most critical in the hazards that they may possess. The rules and instructions for the phones are posted on the wall beside the phone.

4.4.8 Fire alarm pulls are placed in the hallway near both stairwells.

4.4.9 Chemistry labs (BS 205, 209) are provided with chemical burn stations as well as chemical spill kits. Both of these are placed on the wall and readily available in the event of an emergency.

4.4.10 Safety signs are posted on the doors of each lab to show which rooms are equipped with an eye wash and shower.

4.4.11 Warning signs are also posted for the rooms with a specific hazard, i.e. biohazard.

4.4.12 Emergency contacts, with phone numbers, are posted outside each door to the labs. The CHO will semi-annually verify these contact numbers are correct.

4.4.13 MSDS books are provided in each lab and chemical storage room. These MSDS should be reviewed before any experiment is started. These books are updated by the CHO as needed.

4.5 Chemical Procurement and Storage

4.5.1 Chemicals are to be ordered through the Lab Manager. Chemicals and lab equipment or supplies are not to be brought on campus by anyone without prior permission from the Dean of the School of Arts & Sciences and the Instructor. A detailed inventory should be kept up-to-date. Every chemical and biological must be accounted for at all times.

4.5.2 Chemicals are to be received by the Lab Manager and placed in their proper storage facility. Every chemical received must have a MSDS to accompany it. Again, a current inventory list is critical.

4.5.3 Storage facilities are labeled with the type of chemicals and biologicals stored inside, i.e. flammables, corrosives, and biological hazards. Refrigerators used for storage are labeled “Chemical Storage Only.” Food will not be stored in a refrigerator used for chemical or biological storage. The storage facilities for the organic and inorganic chemicals are locked at all times. **No one is to enter them without authorization.**

4.5.4 Chemicals not normally stocked will be requested through the Lab Manager/CHO. The CHO will consult with the Dean and review the MSDS before the chemical is purchased to determine if the department has the proper storage equipment available. This request must be submitted two weeks prior to the date on which the experiment is to be conducted.

4.5.5 Chemicals needed for a research project must be checked- out from the Lab Manager. There is a check-out sheet for this. The MSDS will be consulted before the chemical is released.

4.5.6 Chemicals and biologicals are dated upon arrival and stored in the proper area, based on the information in the MSDS. The chemical inventory is then updated. The expiration date will also be noted for the inventory. When the chemical or biological container is opened, this date will be written on the bottle as well.

4.5.7 Chemicals transferred to a smaller container will need a label noting the proper PPE to be used, the NFPA rating, and the specific hazards to the body. All in- house labels will be in this format.

4.5.8 Chemicals and biologicals will be kept at a minimum for storage purposes. The amount should reflect what is needed in a year’s time.

4.5.9 Chemicals are to be stored by compatibility, not alphabetically. The MSDS will be consulted for the proper storage and the warnings of the incompatible substances.

4.5.10 Rooms used for chemical storage and handling, such as the chemical prep lab, storage rooms, and labs, are controlled access areas.

4.5.11 Liquid chemicals must not be stored on high shelves. This precaution will help to prevent possible spillages.

4.5.12 As in all College facilities, smoking is not allowed in labs or chemical storage rooms.

4.6 Waste Disposal Procedures

4.6.1 Only nontoxic, dilute aqueous solutions should be disposed of in the sink.

4.6.2 Each class of chemicals will have its own waste jar that will be labeled. These jars will be brought to the lab for that day's exercise by the Lab Manager. After each class, these jars will be placed in a special containment area in the Basic Science Prep Lab.

4.6.3 An outside vendor will be called to pick-up the waste.

4.6.4 Broken glass will be disposed of only in designated, puncture resistant containers.

4.6.5 If matches are used in the lab, they are not to be thrown in the waste can unless they have been rinsed with water to make sure that they are not hot.

4.6.6 Waste paper only may be placed in the waste can; it should be kept separate from chemical waste or biological waste. If a paper towel is used to clean up a chemical spill, it should be treated as chemical waste and disposed of it in the proper chemical waste container. If the paper towel is used for a biological waste or to wipe off blood from a cut, this paper towel must be treated as biohazard waste and must be placed in a biohazard bag and autoclaved before it can be thrown away.

4.6.7 Faculty members may be subject to payment of clean up costs (which includes the testing to determine the identity of the chemical) for any chemical left unlabeled after a lab class. Continued failure to comply with clean up procedures shall result in appropriate disciplinary actions. The CHO will not be responsible for the unidentified chemicals or chemical waste.

4.7 Special Procedures for Handling Hazardous Chemicals

4.7.1 Flammables and Combustibles: Flammable chemicals are defined as liquids having a flashpoint below 100°F and solid materials that readily sustain combustion. Liquids with a flashpoint between 100°F and 200°F are generally classed as combustible (ACS, 1998).

4.7.1.1 As in all College facilities, smoking is not allowed in labs or chemical storage rooms.

4.7.1.2 Flammables will be stored in the flammable cabinet in the central storage area. A small amount will be moved to the lab during class time. The chemicals will be moved by the Lab Manager only.

4.7.1.3 Fire extinguishers are present in each lab and outside of each storage room.

4.7.1.4 Fire alarm pulls are in the hallway near each stairwell.

4.7.1.5 Flammables should not be heated with an open flame or hot plate. The preferred way of heating is to use a heating mantle, steam bath, or water bath.

4.7.1.6 When storing flammable liquids in glass bottles, they should not be filled to the top. Space should be left for expansion.

4.7.1.7 Flammables should not be used near an ignition source such as open flame or mechanical equipment.

4.7.1.8 Flammable liquids should not be stored with oxidizing liquids (i.e. nitric acid and sulfuric acid).

4.7.1.9 Spills must be wiped-up immediately, and the CHO/Lab Manager contacted.

4.7.2 Corrosive Chemicals: The Resource Conservation and Recovery Act (RCRA) defines a corrosive chemical as a liquid with a pH < 2.0 or >12.5. Another definition is a strong acid or base that burns, irritates, or attacks tissue, generally through skin exposure.

4.7.2.1 Corrosive fumes are a respiratory hazard. These chemicals must be used under the fume hood.

4.7.2.2 Spills should be cleaned up immediately. The chemistry labs are equipped with a spill kit that has a universal absorbent material for either acids or bases. The absorbent material must be placed on the spill immediately.

4.7.2.3 PPE is very important with corrosives. Chemical splash goggles, aprons, and gloves should be worn when working with these types of chemicals.

4.7.2.4 Strong acids or bases should not be stored with flammable liquids or oxidizing chemicals. The large acid cabinets are used for the storage of acids and the bench top cabinet in the central storage area is labeled corrosives for the bases.

4.7.2.5 Emergency showers and eye washes are used if a corrosive is spilled on the body or in the eyes. If the corrosive has splashed into the eyes, the eyes should be flushed for a minimum of 15 minutes. When showers are required, the clothes are removed from the affected area and the person is rinsed for a minimum of 15 minutes. The fire blanket can be used to cover the person after he/she has been under the shower. An extra set of clothes in several sizes (sweatshirt and

sweatpants) will be kept on hand for the individual to put on after being doused by the emergency shower.

4.7.2.6 Corrosives should be transported with great care. They should be transported in a bottle carrier that is on a cart. The chemicals should not be moved during high traffic times in the building.

4.7.3 Explosive Chemicals: OSHA 1910.1450 defines an explosive chemical as a chemical that causes sudden release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

4.7.3.1 Ethers such as ethyl ether, isopropyl ether, and tetrahydrofuran are examples of low molecular weight ethers requiring special storage and disposal procedures. In addition to their fire hazard, they can form peroxides when exposed to air, which can create an explosion. Check the MSDS on all chemicals to check for peroxide forming chemicals.

4.7.3.2 Chemicals permitted for use in the science department are only those that BSC can legally and properly store.

4.7.3.3 Picric acid is explosive when dry, should contain at least 10% water, and should be kept out of contact with metals as much as possible. Picric acid is very unstable when dry. BSC does not have the capability to handle or store this chemical.

4.7.3.4 Sodium azide should never be poured down the drain. Over time, the azide can react with the metals in the plumbing and form accumulations of lead, copper, and silver azide, which are extremely shock sensitive compounds when dry. Treat drains that have been contaminated with sodium azide with a strong caustic, such as sodium hydroxide.

4.7.3.5 Requests for these chemicals must be made through the CHO who will bring them to the attention of the Dean and Safety Committee for review.

4.7.4 Toxic Chemicals: OSHA defines a toxic substance as a chemical substance or mixture, as such terms are defined in the Toxic Substances Control Act (15 U.S.C. 2601 et seq.) when subject to the labeling requirements of the act and labeling regulations issued under the Act by the Environmental Protection Agency (OSHA 1910.1450). The Environmental Protection Agency defines a toxic substance as a solid waste that exhibits the characteristic of toxicity if using the Toxicity Characteristic Leaching Procedure, Test Method 1311. These toxic chemicals are listed in Table I of the Environmental Protection Agency's Regulation Title 40, Part 261, Section 261.24 Toxic Characteristics.

4.7.4.1 Mercury compounds and metallic mercury are extremely toxic. Mercury must be stored in airtight, plastic containers away from direct sunlight or heat. Trained personnel must be notified when there is a mercury spill.

4.7.4.2 Cyanides are never mixed with acids; hydrogen cyanide is the result and this is a lethal vapor. Cyanides must not be discharged down the drain. They must be picked up by a hazardous waste containment crew.

4.7.4.3 Sulfides must not be mixed with acids; hydrogen sulfide is the by-product and is a lethal vapor.

4.7.5 Compressed Gas Safety and Procedures: A compressed gas is defined as a gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi (pounds per square inch) at 70 deg. F (21.1 deg. C); or a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F (54.4 deg. C) regardless of the pressure at 70 deg. F (21.1 deg. C); or a liquid having a vapor pressure exceeding 40 psi at 100 deg. F (37.8 deg. C) as determined by the American Standard Test Method D-323-72 (OSHA 1910.1450).

4.7.5.1 Cylinders must always be securely fastened, whether in storage, transit, or use.

4.7.5.2 Cylinders must be carefully handled, and should not be dropped, rolled or slid; large cylinders should be transported via a specifically designed cylinder cart. A cylinder should never be lifted by its cap.

4.7.5.3 The cylinder contents must be clearly labeled, and should not be used if it does not have an identification label. The color of the cylinder should not be relied upon to identify its contents.

4.7.5.4 Cylinders not in use shall not be stored in the lab (NFPA 45:8.1.6.4).

4.7.5.5 Students, staff or faculty members should never tamper with cylinder valves, force connections, or use homemade adapters. Use only approved equipment. Never repair or alter cylinders, valves, or relief devices.

4.7.5.6 Compressed gas cylinders must be used only with a regulator compatible with its content. Regulators shall be equipped with two gauges, either on the regulator or remote from the regulator, installed so as to show both the cylinder pressure and the outlet pressure (NFPA 45:8.1.5.2.1). The cylinder valve should be closed when the compressed gas is not being used.

4.7.5.7 When a compressed gas cylinder is empty, the cylinder valve should be turned-off and the cylinder labeled as empty. **Store separately from full cylinders.**

4.7.5.8 Store compressed gas cylinders in well-ventilated areas away from ignition sources, heat, flames, and flammable chemicals. Never artificially cool

cylinders or place them where they can become part of an electrical circuit (ACS, 1998).

4.7.5.9 A compressed gas cylinder should never be completely emptied. A small amount of pressure prevents contamination on refill.

4.7.5.10 Empty gas cylinders should not be refilled on lab premises. Never attempt to mix gases in cylinders.

4.7.5.11 If a gas cylinder leaks, close the valve and clearly identify the cylinder as unusable and hazardous. Contact the vendor immediately (AirGas 325-5702).

4.7.5.12 Keep the protective caps on the cylinders at all times except when the cylinders are in active use (ACS, 1998).

4.7.5.13 Avoid using a wrench on valves equipped with hand wheels. Never hammer a valve to open or to close it. Either of the above actions can cause the wheel valve assembly to leak (ACS, 1998).

4.7.5.14 Check for gas leaks (e.g., use soapy water around connections) (ACS, 1998).

4.7.5.15 Do not store cylinders containing flammable gases with oxidizers, such as nitrous oxide. They must be separated by a minimum of 20 feet for a fire wall at least 5 feet in height (ACS, 1998).

4.7.5.16 Handle cylinders of hydrogen with care; they have a wide flammable range and ignite easily (ACS, 1998).

4.7.5.17 Do not use compressed air tanks to clean clothing or parts of the body (ACS, 1998).

4.7.5.18 Install and store cylinders with local fire codes (NFPA 45:8.1).

4.7.5.19 Do not refill small propane fuel tanks when exhausted; discard them safely (e.g., do not incinerate) (ACS, 1998).

4.7.5.20 Compressed gas cylinders shall have a manual shutoff valve. A quick connect shall not be used in place of a shutoff valve (NFPA 45: 8.1.5.3).

4.7.5.21 Gas cylinders will be checked when placed in the lab, to ensure that the hydrostatic test date is current.

4.8 Emergency Procedures

4.8.1 Chemical Spills/Splashes General Procedures:

4.8.1.1 Consult the MSDS before any cleanup is to be conducted, or before decontamination of the victim. Clean up can commence only if the spill can be cleaned without injury to anyone, is not an emergency, or cannot become an emergency.

4.8.1.2 Contact the CHO, the Dean's Office, and Public Safety immediately in case of any type of emergency or accident. Emergency numbers are posted outside the door to each lab and by the emergency phone. The room must be evacuated.

4.8.1.3 If the chemical is splashed in the eyes, the victim needs to flush the eyes with the emergency eye wash for no fewer than 15 minutes. If the eyes are still burning, the victim needs to be taken to the emergency room. For all types of accidents, the accident victim needs to follow-up with his or her personal physician.

4.8.1.4 If a chemical is spilled or splashed on an individual, the affected area must be rinsed. The lab coat or clothing must be removed, based on the extent of the spill or splash. The victim must be stationed under the emergency shower for no fewer than 15 minutes. Emergency personnel should be called by this time. The fire blanket can be used to cover the victim. Clothes in various sizes kept are by the CHO in case of an emergency. These clothes are to be used by the victim after being doused by the emergency shower.

4.8.1.5 Wear the appropriate PPE that meets the degree of the hazard when starting the cleanup of the spill. The appropriate PPE can be found on the MSDS.

4.8.1.6 The spill kits in each lab contain an inert absorbent that will neutralize an acid or a base. This is to be sprinkled on the spill and wiped up with the absorbent pads. Instructions are included in each kit.

4.8.1.7 Waste from spillage clean-up must not be discarded in trash containers. It should be moved to a containment area to await pick-up by a hazardous waste company.

4.8.1.8 An incident report must be completed and submitted to the CHO as soon as possible.

4.8.1.9 Paperwork from the personal physician's visit should also be filed with the CHO.

4.8.2 Fire Protection and Procedures

4.8.2.1 BSC follows the National Fire Protection Act (NFPA 45 – Fire Protection for Laboratories Using Chemicals).

4.8.2.2 If a fire alarm sounds in the building, all equipment is to be turned off (where appropriate) and occupants should evacuate the building in an orderly fashion. Faculty and staff members will help to see that students and other personnel have departed the labs and lecture rooms.

4.8.2.3 If the fire alarm is pulled and it is not an emergency, the perpetrator will be subject to citations and/or arrest by the Director of Public Safety or city police.

4.8.2.4 Each lab and chemical storage room is equipped with the appropriate fire extinguisher. The fire extinguishers are checked annually by an outside vendor. Training on fire extinguisher use will be accomplished by the Bluefield City Fire Department for the faculty and staff and will occur as needed.

4.8.2.5 Each lab and chemical storage room is equipped with a sprinkler system. This system is also checked annually by an outside vendor.

4.8.2.6 Fire blankets are stored in each lab. They are used for a person catching on fire, for warmth for a shock victim, or for modesty when someone has been under the emergency shower. When a person is on fire, the blanket is thrown over him or her and the person is told to lie down on the floor to prevent spreading of the fire. The best response is “stop, drop, and roll,” to smother the flames to extinguish them. After the flames have been extinguished, place the victim under the emergency shower. This will stop the burning and act as an anesthetic when the skin starts to cool.

4.8.2.7 Proper chemical storage is an important fire safety procedure. The flammable chemicals are stored in flammable proof cabinets.

4.8.2.8 Glass equipment operated under either a vacuum or pressure shall be shielded, wrapped in duct tape, or otherwise protected from shattering during use (NFPA 45:9.1.6.2).

4.8.2.9 Lab operations, such as reactions at temperatures and pressures either above or below ambient conditions, shall be conducted in a manner that minimizes hazards. Shielding shall be used whenever there is a reasonable probability of explosion or vigorous chemical reaction and associated hazards during charging, sampling venting, and discharge of products (NFPA 45: 9.1.6.1).

4.8.3 Biological Hazards and Procedures

4.8.3.1 All biological materials, including lab equipment or supplies, will be ordered through the lab manager, since all biological reagents and agents must be

accounted for at all times. No biological material, including lab supplies or equipment, will be brought on campus without permission of the Instructor and the Dean of the School of Arts and Sciences.

4.8.3.2 Biological materials are stored in refrigerators or cabinets labeled “Biological Hazards”.

4.8.3.3 Proper PPE will be strictly followed when handling any type of biological material. Lab coats and gloves are to be worn while in the lab. The lab coats and gloves must not be removed from the lab. Used gloves must be placed in the biological waste bag, rather than in a trash receptacle.

4.8.3.4 Biological waste must be sterilized by the autoclave prior to disposal.

4.8.3.5 Equipment must be sterilized after use and then washed with “Alconox”.

4.8.3.6 The eyes and body of a spill or splash victim should be flushed, using the emergency eye wash and/or shower, for no less than 15 minutes. The victim’s clothes are to be removed and autoclaved.

4.8.3.7 The CHO, Dean, and Public Safety must be notified as soon as possible following such an incident. An incident report should be filed as soon as possible.

4.8.3.8 The accident victim should follow-up with his or her personal physician; copies of any paperwork pertinent to the visit should be brought to the CHO for filing.

4.8.3.9 If animals are used in research, certain precautions, as shown below, must be followed to ensure the safety of the faculty, staff, and students. Such research must have the prior approval of the Dean and/or Safety Committee before beginning.

4.8.3.9.1 Access to the research lab must be restricted.

4.8.3.9.2 Toxic substances should be administered by injection or gavage, rather than via the animal’s diet. If administration must be via the diet, use a caging system under negative pressure or under laminar air flow directed toward HEPA filters.

4.8.3.9.3 Devise procedures which minimize formation and dispersal of contaminated aerosols, including those from food, urine, and feces (e.g. HEPA filtered vacuum equipment for cleaning, moisten contaminated bedding before removal from the cage, and mix diets in closed containers in a hood.

4.8.3.9.4 When working in the animal room, wear plastic or rubber gloves, fully buttoned lab coat or jumpsuit (if needed) because of incomplete suppression of aerosols, plus other apparel and equipment (shoe and head coverings, respirator).

4.8.3.9.5 Dispose of contaminated animal tissues and excreta by incineration if the available incinerator can convert the contaminant to non-toxic products; otherwise, package the waste appropriately for burial in an EPA approved site. BSC does not have an incinerator of this type so the contaminated animals will be picked up by an outside vendor.

4.8.3.9.6 Description of all waste and animal disposal requirements is shown below:

4.8.3.9.6.1 Cages, bedding, water bottles, and lab supplies contaminated with any pathogen (bacteria, fungi, Chlamydia, or virus) must be steam autoclaved before disposal in the regular trash.

4.8.3.9.6.2 Infected animals sacrificed by Carbon Dioxide inhalation must be stored in the -86 degrees C freezer until shipment for infectious waste disposal to a contracted environmental service provider.

4.8.3.9.6.3 Shipping processes: Materials are usually inactivated with the application of bleach on the shipment date. The provider will inform the College of the profiles of the waste stream, and obtain approval for future shipment. Materials will be approved for direct drop incineration to the provider's facility.

4.8.4 General Accident Procedures

4.8.4.1 In the event of an accident, or of minor or major emergencies, the CHO, the Dean, and Public Safety must be notified as soon as possible. For all types of accidents, an incident report must be completed and filed as soon as possible; the report will be maintained by the CHO and the Director of Public Safety.

4.8.4.2 For minor injuries, each lab is equipped with a fully stocked first aid box. The CHO routinely checks the boxes to ensure that the box contains all the supplies needed.

4.8.4.3 For minor cuts, the wound should be flushed with tepid water to remove any possible chemical contaminants. In case of a cut on a gloved hand, remove the glove after thoroughly washing the affected area to avoid contamination of the cut with chemicals or biologicals. Apply a bandage and advise the victim to watch

for infection. If there is a possibility that the wound is contaminated by broken glass or chemicals, the victim should seek immediate medical attention.

4.8.4.4 For larger cuts that will need sutures, call 8-911 and then the CHO, the Dean, and Public Safety (NOTE; THESE INDIVIDUALS SHOULD BE CONTACTED IN THE CASE OF ANY OF THE INCIDENTS DESCRIBED BELOW). Apply sterile gauze from the first aid box to the wound. If necessary, apply direct pressure to the wound to stop the bleeding. Apply additional pads if the blood soaks through first sterile pad. If bleeding still continues, have the victim lie down and elevate the wounded area above the level of the victim's heart until the paramedics arrive.

4.8.4.5 Thermal burns:

4.8.4.5.1 For first degree burns, flush with copious amounts of tepid water. Apply a moist dressing and bandage loosely.

4.8.4.5.2 For second and third degree burns, do not flush with tepid water. Apply an ice compress and then place a dry dressing and bandage loosely. Immediately seek medical attention.

4.8.4.6 For chemical burns, there is a chemical burn wash station in each chemistry lab. The instructions are on the bottle. Immediately flush the area with tepid water for no fewer than 15 minutes. Remove any jewelry, contaminated clothing, and shoes. Place the victim under the safety shower, if necessary. Do not apply ointments, baking soda, ice, or gauze coverings to the wound. Seek immediate medical attention.

4.8.4.7 For ingestion of chemicals, call 8-911 immediately. Do not encourage vomiting except under the advice of a physician. Call the poison control center immediately and consult the MSDS for the appropriate action. **Poison Control Center: 8-1-800-642-3625.** Save the chemical containers and a small amount of vomitus, if possible, for analysis. Stay with the victim until emergency medical assistance arrives.

4.8.4.8 For unconsciousness, call 8-911 immediately. Also, call the CHO, Public Safety, and the Dean. Do not attempt to remove the victim from the area unless there is an immediate danger. Clear the area of the chemical spill or broken glassware. If the victim begins to vomit, turn the head so the stomach contents are not pushed into the lungs.

4.8.4.9 For convulsions, call 8-911 immediately. Also, call the CHO, Public Safety, and the Dean. If it is safe to enter the area, remove anything that might cause harm to the victim. Clear the area of any chemical spills or broken glassware. If the victim begins to vomit, turn the head so that the stomach contents are not pushed into the lungs.

SECTION 5. SAFETY TRAINING

5.1 First aid and CPR training

5.1.1 This training is provided, free of charge to the School of Arts and Sciences, by the School of Nursing and Allied Health of BSC. The only cost is for individual certification cards.

5.1.2 The science faculty, full time and adjunct, should be certified in first aid and CPR in case of an emergency that may occur during classes or labs.

5.1.3 First aid and CPR training will occur annually.

5.1.4 The CHO will schedule CPR training, and will maintain training records.

5.2 Fire Safety Training

5.2.1 The faculty and staff shall be trained in the proper use of fire extinguishers. This will occur on a regular basis and include new staff and faculty. This will be accomplished through the local fire department or a fire safety specialist.

5.3 Safety Information Availability

5.3.1 The CHO maintains several references on safety for chemical and biological hazards. These are available for check out.

5.3.2 Additional information and sources are continually being added to the library.

5.4 Chemical Hygiene Policy (CHP) Training

5.4.1 As per requirements of this institution all science faculty, full-time and adjunct, and appropriate staff members will be trained on the Chemical Hygiene Policy. This training will occur in the beginning of the 2007 fall semester. This training will also occur periodically in the event of any changes to content or employees.

5.4.2 Recipients of the document will be requested to sign and submit a form indicating that they have read and understand the document.

5.4.3 The Safety Committee will, periodically, revise the Chemical Hygiene Policy to reflect improvements in safety research and procedures, increases in campus-based research, and the changing needs of Bluefield State College.

5.5 Medical Monitoring

5.5.1 According to OSHA 29 CFR 1910.1450 (g), all employees of BSC who suspect that they might have been exposed to hazardous chemicals or a biological substance will be provided the opportunity for a medical examination or continued monitoring. This will occur in the following instances:

5.5.1.1 If the employee shows signs or symptoms of exposure associated with the hazardous chemical or biological substance he or she was using, or

5.5.1.2 If there is a spill, leak, or other occurrence resulting in the likelihood of exposure, or

5.5.1.3 If there is exposure to an OSHA regulated substance (i.e. formaldehyde). Monitoring in such cases will be dictated by the OSHA standard for that substance.

5.5.2 All medical examinations and consultations shall be performed by, or under the direct supervision of, a licensed physician and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place (OSHA 29 CFR 1910.1450 [g] [2]).

5.5.3 Information given to the physician by BSC shall consist of the following (OSHA 29 CFR 1910.1450 [g] [3]):

5.5.3.1 Identity of the hazardous chemicals or biological agent to which the employee may have been exposed. A copy of the MSDS will accompany that person to the physician's office. The MSDS will contain all pertinent information.

5.5.3.2 Description of the conditions under which the employee may have been exposed. A copy of the incident report will be forwarded to the physician.

5.5.3.3 Description of the signs and symptoms of exposure that the employee is experiencing.

5.5.4 The physician's opinion from the medical examination will be forwarded back to BSC and the records will be maintained by the CHO. These opinions should consist of the following (OSHA 29 CFR 1910.1450 [g] [4]):

5.5.4.1 Any recommendation for further medical treatment.

5.5.4.2 The results of the examination and any tests that were performed.

5.5.4.3 Any medical condition discovered during the examination that could place the employee at an increased risk as a result of exposure to a hazardous workplace.

5.5.4.4 A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

5.5.4.5 The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.