North Carolina
State Bureau of Investigation

Crime Laboratory

Safety Manual

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Approved by:

Assistant Director, Jerry Richardson

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Safety Coordinator, Mark T. Boodée

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N C State Bureau of Investigation

Crime Laboratory Safety Manual

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1.0 AUTHORITY AND ACCOUNTABILITY

1.1 PURPOSE

This manual supplements the ***NORTH CAROLINA DEPARTMENT OF JUSTICE SAFETY AND HEALTH MANUAL* (*DOJ Safety Manual*)** to meet the special conditions that are unique to the SBI Crime Laboratory. This requirement is outlined in Section 2 of the *DOJ Safety Manual* - **Authority and Accountability**.

1.2 SCOPE

This section applies to all sections of the North Carolina State Bureau of Investigation Crime Laboratory (NCSBI Crime Laboratory), Raleigh, NC, the Western Regional Laboratory, Skyland, NC, and the Triad Regional Laboratory in Greensboro, NC. This also applies to any unit or section which may be assigned to the NCSBI Crime Laboratory Building in Raleigh, North Carolina, the Western Regional Laboratory, Asheville, NC, or the Triad Regional Laboratory in Greensboro, NC

1.3 DEFINITIONS

The term Safety Officer (SO) and Chemical Hygiene Officer (CHO) will be referred to as the Safety and Chemical Hygiene Officer (S&CHO) throughout the rest of this document. The Chemical Hygiene Officer is concerned with the Chemical Hygiene Plan and the safe use of chemicals within the laboratory. The Safety Officer is responsible for all other aspects of workplace safety (e.g. emergency evacuation plans, safety audits, accident reporting, and fire safety). These positions could be occupied by one or two persons at the discretion of the SAC/Supervisor.

1.4 ACCIDENT/INCIDENT REPORTING

An accident usually includes physical injury of some type. An incident may not include physical injury but involves safety issues (e.g., chemical spill, discharge of a firearm, etc.). All accidents and/or incidents will be reported in accordance with Section VI, Accident Reporting and Investigation of the *DOJ Safety Manual.*

1.5 NCSBI CRIME LABORATORY SAFETY COMMITTEE

The NCSBI Crime Laboratory Safety Committee shall be established with representatives from every unit or section of the NCSBI Crime Laboratory and to any unit or section which may be assigned to the NCSBI Crime Laboratory Building.

The member should be the Unit or Section S&CHO. The committee may meet monthly but no less than quarterly.

The purpose of the meeting will be to:

1. Assure that jobs are planned for the safety of the employees;
2. Assure employees are receiving appropriate safety and health training;
3. Assure employees are involved in the safety and health program;
4. Assure the workplace is inspected monthly and hazards are controlled.

The committee will have a chairperson appointed by the Laboratory Director. The chairperson will ensure a written summary of each meeting is prepared and submitted to the Laboratory Director. The Crime Laboratory Director will serve as the *ex officio chair*.

1.6 CRIME LABORATORY DIRECTOR

The Crime Laboratory Director is ultimately responsible for assuring that the NCSBI Crime Laboratory Safety Program is implemented and maintained. Additional responsibilities are to include:

1. Representing the NCSBI Crime Laboratory at the DOJ Central Safety Committee meeting or appointing a designee.
2. Serving as *ex officio chair* of the NCSBI Crime Laboratory Safety Committee.
3. Adopting a plan for disciplinary action as a corrective measure against employees who violate procedures in the safety program.

1.7 SAC/SUPERVISOR

From Section II.1 of **Administration and Authority**, subsection **Supervisor** of the *DOJ Safety Manual*:

> *"Each Supervisor is responsible for providing safe working conditions for those being supervised and for following up on reports of violations of safe working conditions. Each supervisor is also responsible for knowing the safety and health guidelines, conducting safety meetings and audits, investigating accidents, reporting of accidents, and properly advising higher management of appropriate situations."*

Additional responsibilities include:

1. Appoint the Section or Unit S&CHO.
2. Ensure all members of their Section/Unit adhere to the NCSBI Crime Laboratory Safety Program.

1.8 SECTION/UNIT SAFETY AND CHEMICAL HYGIENE OFFICER

Each Section SAC/Supervisor will appoint a Safety & Chemical Hygiene Officer for their respective section. Additional responsibilities include:

1. Serving as the Section/Unit representative to the Laboratory Safety Committee. Must work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.
2. Knowing NCSBI and NCDOJ safety and health guidelines.
3. Determining that facilities and training levels are adequate for the chemicals in use within their section.
4. Ensuring and documenting that appropriate training has been provided to employees, maintain safety training records for the Section/Unit.
5. Performing monthly, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment; documenting and maintaining records of the inspection for a period of no less than five (5) years,
6. Reviewing and improving the Chemical Hygiene Plan on an annual basis,
7. Determining the proper level of personal protective equipment, ensuring that such protective equipment is available and in working order.
8. Monitoring the waste disposal program (if applicable).

1.9 EMPLOYEE

From Section II.1 of **Administration and Authority**, subsection **Employee** of the *DOJ Safety Manual:*

> *"Each DOJ employee is to place safety and health requirements as first importance in the performance of their work duties. The protection of fellow employees and the public on State property is a shared responsibility of every employee."*
>
> "*An employee is responsible for notifying his/her immediate supervisor of a violation or deficiency in a safe and healthful working condition and for recommending corrective measures, if possible. Additionally, the employee's immediate supervisor is to be notified of every injury or accident regardless of how trivial such accident may appear at that time."*

2.0 CHEMICAL HYGIENE PLAN

2.1 COMPANY DATA

North Carolina State Bureau of Investigation Crime Laboratory
121 East Tryon Road
Raleigh, North Carolina 27603

North Carolina State Bureau of Investigation Western Laboratory
9B Walden Ridge Drive
Skyland, North Carolina 28776

North Carolina State Bureau of Investigation Triad Laboratory
Guilford Building
2306 W Meadowview Road Suite 110
Greensboro, NC 27407

2.2 FORWARD

On 31 January, 1990 the Occupational Safety and Health Administration (OSHA) promulgated a final rule for occupational exposure to hazardous chemicals in laboratories. Included in the standard, which became effective on 1 May, 1990 is a requirement for all employers covered by the standard to develop and carry out the provisions of a Chemical Hygiene Plan (CHP).

A CHP is defined as a written program which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace. Components of the CHP must include standard operating procedures for safety and health, criteria for the implementation of control measures, measures to ensure proper operation of engineering controls, provisions for training and information dissemination, permitting requirements, provisions for medical consultation, designation of responsible personnel, and identification of particularly hazardous substances.

This plan is the Chemical Hygiene Plan developed for the NCSBI Crime Laboratories located at 121 East Tryon Road in Raleigh, NC, 9B Walden Ridge Drive in Skyland, NC, and 2306 W Meadowview Road Suite 110 in Greensboro, NC. This CHP is maintained readily available to laboratory employees. All laboratory personnel must know and follow the procedures outlined in this plan. All operations performed in the laboratory must be planned and executed in accordance with the enclosed procedures. In addition,

each employee is expected to develop safe personal chemical hygiene habits aimed at the reduction of chemical exposures to themselves and co-workers.

This document was developed to comply with paragraph (e) of the referenced OSHA 1910.1450 standard. Each Section Safety & Chemical Hygiene Officer (S&CHO) will maintain the facilities and procedures employed in their section of the laboratory compatible with current knowledge and regulations in laboratory safety. This CHP will be reviewed, evaluated and updated at least annually and is readily available to employees, their representatives and any representative of the Assistant Secretary of Labor of OSHA.

2.3 STANDARD OPERATING PROCEDURES (SOP) FOR LABORATORY CHEMICALS

A. Chemical Procurement

1. The decision to procure a chemical shall be a commitment to handle and use the chemical properly from initial receipt to ultimate disposal.

2. All chemicals shall be received in a central location. Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt. Chemical containers shall not be accepted without accompanying labels and packaging in accordance with all appropriate regulations. All chemical shipments should be dated when received and opened. MSDS must be available.

B. Chemical Storage

1. Received chemicals shall be moved to the designated storage area for the section. Large glass containers shall be placed in carrying containers or shipping containers during transportation.
2. The storage area shall be well-illuminated. Large containers shall be stored as close to the ground as possible.
3. Chemicals shall be segregated by hazard classification and compatibility in a well-identified area, with local exhaust ventilation.
4. Mineral acids should be separated from flammable and combustible materials. Separation is defined by NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials.
5. Acid-resistant trays shall be placed under bottles of mineral acids.
6. Acid-sensitive materials such as cyanides and sulfides shall be separated from acids or protected from contact with acids.
7. The storage area shall be accessible during normal working hours.
8. When highly toxic, caustic, or flammable chemicals are taken from the storage area, they shall

be placed in an outside container or bucket.

9. Storage of chemicals at the laboratory bench or other work areas shall be limited to amounts as small as practical. Chemicals in the workplace shall not be exposed to sunlight or heat.
10. Stored chemicals shall be examined at least annually by the Section S&CHO for replacement, deterioration, and container integrity. The inspection should determine whether any corrosion, deterioration, or damage has occurred to the storage facility as a result of leaking chemicals.

C. Chemical Handling

Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this CHP to minimize personal and coworker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized.

General precautions which shall be followed for the handling and use of all chemicals are:

1. Skin contact with all chemicals shall be avoided.
2. All employees shall wash all areas of exposed skin prior to leaving the laboratory.
3. Mouth pipetting or starting a siphon is prohibited.
4. Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present is prohibited. Hands shall be thoroughly washed prior to performing these activities.
5. Storage, handling and consumption of food or beverages shall not occur in storage areas, refrigerators, glassware or utensils used for laboratory operations.
6. Risk determinations shall be conservative in nature.
7. Any chemical mixture shall be assumed to be as toxic as its most toxic component.
8. Substances of unknown toxicity shall be assumed to be toxic.
9. Laboratory employees shall read the MSDS of all chemicals being used and shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.
10. The intent and procedures of this Chemical Hygiene Plan shall be adhered to continuously.
11. In all cases of chemical exposure, neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) shall be exceeded.
13. Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the Section S&CHO.

D Laboratory Equipment and Glassware

Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled. At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of laboratory equipment:

1. All laboratory equipment shall be used only for its intended purpose.
2. All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in a broken glass container.
3. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.

E. Personal Protective Equipment

1. Chemical goggles and/or a full face shield shall be worn during chemical transfer and handling operations as procedures dictate.
2. Sandals, perforated shoes, cloth sneakers/tennis shoes and bare feet are prohibited when working with hazardous chemicals. Safety shoes are required where employees routinely lift heavy objects.
3. Laboratory coats are provided and should be worn in the laboratory when the possibility of contamination exists. Laboratory coats will be laundered on a periodic basis, not to exceed monthly. Laboratory coats shall be removed immediately upon discovery of significant contamination.
4. Appropriate chemical-resistant gloves shall be worn at all times when there may be skin contact with chemicals. Used gloves shall be inspected and washed prior to re-use. Damaged or deteriorated gloves will be immediately replaced.

5. Thermal-resistant gloves shall be worn for operations involving the handling of heated materials, exothermic reaction vessels, or with extremely cold substances. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.

F. Personal Work Practices

1. Laboratory supervision shall ensure that each employee knows and follows the rules and procedures established in this plan.
2. All employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and or conditions promptly.
3. Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.
4. Use only those chemicals appropriate for the ventilation system.
5. Avoid unnecessary exposure to all chemicals by any route.
6. Do not smell or taste any chemicals.
7. Encourage safe work practices in coworkers by setting the proper example. Horseplay is strictly forbidden.
8. Seek information and advice from knowledgeable persons, standards and codes about the hazards present in the laboratory. Plan operations, equipment and protective measures accordingly.

9. Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure.

G. Labeling

1 All containers in the laboratory that contain chemicals shall be labeled. The label shall be informative and durable, and at a minimum, will identify contents, date of acquisition or date prepared, and expiration date.
2. Portable containers shall be labeled by the individual using the container.
3. Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for the immediate use of the employee who performed the transfer.
4. Before transferring chemicals for immediate use, the employee shall be trained in the use of Material Safety Data Sheets (MSDS) and shall have read the MSDS and for the specific chemical being transferred as per the Hazardous Communication Policy in the DOJ Safety & Health Manual.
5. The labeling of reagents & chemicals within each Section shall be inspected annually by the Section S&CHO (to coincide with audits of each Section as per ASCLD-LAB) to ensure labels have not been defaced or removed.

2.4 CRITERIA FOR IMPLEMENTATION OF CONTROL MEASURES

A. Air Sampling

1. Upon addition of new chemicals or changes in control procedures, additional air sampling will be considered to determine the exposures. If there is reason to believe exposure levels for regulated substances that require sampling routinely exceed the action level, or in the absence of an action level, the PEL, air sampling shall be conducted according to the current industry standard.
2. The results of air sampling studies performed in the laboratory shall be maintained and recorded by the Section S&CHO.

B. Housekeeping

1. Each laboratory worker is directly responsible for the cleanliness of his or her work space, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards.
2. The following procedures apply to the housekeeping standards of the laboratory:

(a) All chemical wastes will be disposed of properly.
(b) The laboratory benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
(c) The work area shall be cleaned at the end of each operation and each shift, if used.
(d) All apparatus shall be thoroughly cleaned and returned to storage upon completion of usage.

(e) All floors, aisles, exits, fire extinguishing equipment, eye washes, showers, electrical disconnects and other emergency equipment shall remain unobstructed.

(f) All labels should face forward.

(g) Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage.

C. Safety and Emergency Equipment

1. Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate shall be posted in a common and accessible area.
2. Some laboratory personnel will be trained in the proper use of fire extinguishers. Prior to the procurement of new chemicals, the Section S&CHO shall verify that existing extinguishers and other emergency equipment are appropriate for such chemicals.
3. All employees who might be exposed to chemical splashes shall be instructed in the location and proper usage of emergency showers and eye washes. The eyewash and emergency shower shall be inspected monthly. These inspections shall be performed by the Section S&CHO. Records shall be maintained.
4. Location signs for safety and emergency equipment shall be posted.
5. Fire extinguishers and any other fire safety equipment will be inspected monthly by the Section S&CHO.

2.5 ENGINEERING CONTROLS

A. Intent

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized.

B. Modification

No modification of engineering controls will occur unless testing indicates that worker protection will continue to be adequate.

C. Improper Function

Improper function of engineering controls must be reported to the Section S&CHO immediately. The system shall be taken out of service until proper repairs have been executed.

D. Usage

All employees shall follow proper work practices when using the engineering controls.

1. Local Exhaust Ventilation:
The following procedures shall apply to the use of local exhaust ventilation:

(a) Openings of hoods shall be placed as close as possible to sources of the air contaminant.
(b) Clear the screen on the face of the hood prior to usage.
(c) Hood fans shall operate when hoods are being used.
(d) After using hoods, operate the fan for an additional period of time sufficient to clear residual contaminants from the duct work.

2. Laboratory Hoods:

The laboratory hoods shall be utilized for all chemical procedures which might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile or toxic.

The following work practices shall apply to the use of hoods:

(a) Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood.
(b) Keep the sash of the hood lowered at all times except when working within the hood. At these times, maintain the sash height as low as possible.
(c) Storage of chemicals and equipment inside the hood shall be kept to a minimum.
(d) Minimize interference with the inward flow of air into the hood.
(e) Leave the hood operating when it is not in active use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.
(f) The ventilation system shall be certified annually by a designated vendor. The hood face velocity should be maintained between 75 and 125 feet per minute.
(g) Prior to the introduction of new chemicals, the adequacy of hood ventilation systems shall be determined by the Section S&CHO.

3. Storage Cabinets:

Storage cabinets for flammable and hazardous chemicals will be ventilated in accordance with the local building code for laboratory type buildings.

2.6 EMPLOYEE INFORMATION AND TRAINING

A. Hazard Information

All employees will be apprised of the hazards presented by the chemicals in use in the laboratory. Each employee shall receive training at the time of initial assignment to the laboratory and prior to assignments involving new exposure situations.

B. Training

This training shall include methods of detecting the presence of a hazardous chemical, physical and health hazards of chemicals in the laboratory, and measures employees can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan, and shall include:

1. the location and availability of the Chemical Hygiene Plan;
2. signs and symptoms associated with exposure to the chemicals present in the laboratory;
3. location and availability of reference material on chemical hygiene;
4. training shall be conducted by the Section S&CHO or designee.

2.7 PRIOR APPROVAL OF LABORATORY ACTIVITIES

A. Special Work Schedules or Conditions

Some laboratory activities present specific, foreseeable hazards to the employees. These activities include off-hours work, sole occupancy of building, hazardous operations and unattended operations. Permission from the SAC must be given to work under these conditions.

1. Off-Hours Work Procedures:
Laboratory personnel are not permitted to perform hazardous operations outside normal business hours. Normal business hours are generally 8:00am to 5:00pm, Monday through Friday. These hours may vary by Section.

2. Sole Occupancy:
At no time shall hazardous work be performed in the laboratory when the only person in the building is the laboratory person performing the work. Under unusual conditions,

cross checks, periodic security guard checks, closed circuit television, or other measures may be taken when permitted.

3. Hazardous Work:
All hazardous operations are to be performed during a time when at least two personnel are present in the section. At no time shall a laboratory person, while working alone in the laboratory, perform work that is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor.

4. Unattended Operations: (Except automated and/or robotic operations)
When potentially hazardous laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

(a) Inform immediate coworkers of the operation.

(b) The laboratory supervisor will review work procedures to ensure for the safe completion of the operation.
(c) An appropriate sign will be posted at all entrances to the laboratory.
(d) The overhead lights in the laboratory will be left on.
(e) Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).
(f) The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

2.8 MEDICAL CONSULTATIONS AND EXAMINATIONS

A. Opportunity for Medical Attention

An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. The opportunity for medical attention will be made available to employees under the following circumstances:

1. Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory,

2. Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or,

3. Whenever an event takes place in the laboratory such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure the employee will be provided an opportunity for medical consultation for the purpose of determining the need for medical examination.

B. Cost

These medical consultations and examinations shall be provided without cost to the employees, without loss of pay and at a reasonable time and place.

C. Supervision

These medical consultations and examinations shall be administered by or under the direct supervision of a licensed physician. A current list of available physicians is maintained by the DOJ Health & Safety Officer. Employees seeking the opportunity of medical consultation should request the listing from the DOJ Health & Safety Officer.

2.9 SPECIAL PRECAUTIONS

When laboratory procedures change to require the use of additional classifications of chemicals

(allergens, embryotoxins, teratogen, carcinogens, etc.), additional special precautions shall be implemented as deemed necessary by the Section S&CHO.

A. Working with Allergens and Embryo toxins

1. Suitable gloves to prevent hand contact shall be worn when exposed to allergens or substances of unknown allergen activity.
2. Women of child-bearing age will handle embryo toxins only in a hood with confirmed satisfactory performance and will use protective equipment to prevent skin contact as prescribed by the supervisor and Section S&CHO.
3. Embryo toxins will be stored in adequately ventilated areas..
4. The supervisor and Section S&CHO will be notified of spills and other exposure incidents. A physician will be consulted when appropriate.

B. Working with Chemicals of Moderate Chronic or High Acute Toxicity

1. Areas where these chemicals are stored and used are of restricted access and have special warning signs.
2. A chemical fume hood with a minimum face velocity of 60 linear feet per minute or other containment device will be used. Released vapors will not discharge with the hood exhaust, but will be trapped.
3. Gloves and long sleeves will be used. Hands and arms will be washed immediately after working with these chemicals.
4. Two people will always be present during work with these chemicals.

C. Working with Chemicals of High Chronic Toxicity

1. All transfer and work with these substances shall be in a designated area: a restricted access hood, glove box or portion of laboratory.
2. Approval of the supervisor will be obtained before use.
3. Vacuum pumps must have scrubbers or high efficiency particulate absolute (HEPA) filters.
4. Any contaminated equipment or glassware will be decontaminated in the hood before removing them from the designated area.
5. For powders, a wet mop or vacuum with a HEPA filter will be used for cleanup.
6. The designated area will be marked with warning and restricted access signs.
7. Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, secondary containers.

2.10 RECORD KEEPING

A. Accident investigations will be conducted by the immediate supervisor with assistance from other personnel as deemed necessary.

B. Accidents reports will be written and retained for 5 years.

C. Exposure records for hazardous chemicals and harmful physical agents will be maintained for 30 years per 29 CFR 1910.20 by Department of Justice Safety Officer.

D. Medical records for employees exposed to hazardous chemicals and harmful physical agents will be maintained for the duration of employment plus 30 years per 29 CFR 1910.20 by Department of Justice Safety Officer.

E. Records of inspections of equipment will be maintained for 5 years by the Section S&CHO.

G. Records of employee training will be maintained for 5years by the Section S&CHO.

2.11 CHEMICAL SPILLS, RELEASES AND ACCIDENTS

a) All small spills on laboratory benches or floors shall be immediately cleaned and the waste shall be properly disposed. If the worker who causes or notices the spill does not feel they can clean up the spill safely, then a supervisor should be notified and the supervisor should determine the best course of action for cleaning up the spill.

b) Hazardous or Large spills: If a large chemical spill or a hazardous spill or release occurs, then a determination must be made quickly as to a course of action. If the spill or release is too large or the material is too hazardous to be cleaned up safely, the area should be evacuated (and possibly the entire building depending on the severity of the spill and hazard of the chemical), and the local Hazardous Material Spill team will be notified immediately by dialing "911". For the Raleigh NCSBI Crime Laboratory, the Raleigh Haz*Mat Team will be called. For the Western Regional Laboratory, the Asheville Haz*Mat Team will be called. For the Triad Regional Laboratory, the Greensboro Haz*Mat Team will be called.

2.12 ANNUAL CHEMICAL HYGIENE PLAN AUDIT

The Crime Laboratory Safety Committee will conduct an audit of all phases of the Chemical Hygiene Plan each year. Results will be provided to the Assistant Director of Crime Laboratory Services. Supervisors are responsible for taking corrective action.

2.13 REFERENCES AND RECOMMENDED READING

National Research Council, Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Academy Press, Washington, D.C. 1981.

National Research Council, Prudent Practices for Disposal of Chemicals from Laboratories, National Academy Press, Washington, D.C., 1983.

Freeman, N.T., Introduction to Safety in the Chemical Laboratory, Academy Press,1982.

Manufacturing Chemists' Association, Inc., Guide For Safety In The Chemical Laboratory, D. Van Nostrand Company, Inc., 1954.

Green, Michael E., Safety In Working With Chemicals, MacMillan Publishing Co.,Inc.1978.

Pipitone, David A., Safe Storage of Laboratory Chemicals, Wiley & Sons, Inc. 1984.

Code of Federal Regulations, 29 CFR part 1910 sub part Z section 1910.1450,Occupational Exposure to Hazardous Chemicals in Laboratories, 1990.

2.14 SPECIFIC SECTION S&CHO RESPONSIBILITIES OUTLINED IN THE CHEMICAL HYGIENE PLAN:

Sec. 2.4.C.3 Shower and eyewash stations shall be inspected monthly, and the inspection shall be documented by the Section S&CHO.

Sec. 2.6.B.4 Safety training for new employees is required. Should include, but not be limited to, the fire evacuation plan, location of hazardous work areas (i.e., chemical storage rooms), and other items listed in the Chemical Hygiene Plan.

Sec. 2.3.G.5 The labeling of reagents & chemicals shall be inspected annually by the Section S&CHO to ensure that labels have not been defaced or removed.

Sec. 2.4.C.5 Fire extinguishers and any other fire safety equipment within each section will be inspected monthly by the Section S&CHO.

Sec. 2.9.B.1-9

1. Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices,
2. Determine that facilities and training levels are adequate for the chemicals in use.
3. Perform monthly, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment and document and maintain records of the inspection for a period of no less than five (5) years,

4. Help project directors develop precautions and adequate facilities,
5. Review and improve the Chemical Hygiene Plan on an annual basis,
6. Maintain overall responsibility for the laboratory operation,
7. Ensure that workers know the chemical hygiene rules,
8. Determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order,
9. Ensure that appropriate training has been provided to employees.

3.0 BLOODBORNE PATHOGEN COMPLIANCE PROGRAM

3.1 POLICY

1.1 This policy is designed to help NCSBI Crime Laboratory employees eliminate or minimize exposure to bloodborne pathogens or other potentially infectious materials. The degree of risk of acquiring bloodborne pathogens on the job is directly related to the frequency of parental exposure to blood. Non-intact skin, eye and mucous membrane exposure to blood poses a lower risk, and exposure to other potentially infectious body materials, still a lower risk.

1.2 The NCSBI Crime Laboratory complies with 29 CFR 1910.1030, the OSHA Bloodborne Pathogens Standard and relevant sections of the North Carolina communicable disease law and rules [G.S. 130A-144, 15A NCAC 19A .0201(b)(4)(e) and (f), .0202(4) and (9)], and .0203(b)(3)], and North Carolina medical waste management laws and rules
[G.S. 130A-309.26 and 15A NCAC 13B .1200 to .1207.

1.3 The policy outlines steps to prevent occupational exposure and specific procedures to be followed if an inadvertent percutaneous or permucosal exposure occurs.

1.4 The policy and procedures shall be reviewed and updated at least annually and whenever necessary to reflect new job descriptions and modified tasks and procedures that affect occupational exposure.

3.2 EMPLOYEES AFFECTED

All full-time and part-time employees to include interns who have occupational exposure to bloodborne pathogens are covered by this policy and its standard operating procedures.

3.3 DEFINITIONS

3.3.1 Bloodborne Pathogens: Microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

3.3.2 Potentially Infectious Materials: Includes body fluids (including but not limited to blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures) and any body tissue.

3.3.3 Occupational Exposure: Actual or potential parenteral, skin, eye or mucous membrane contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

3.3.4 Universal Blood and Body Fluid Precautions: An approach to infection control. According to the concept of universal precautions, all human blood; body components including serum; other body

fluids (including visible blood; semen; vaginal secretions; tissues; and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids) are treated as if they are infectious for HIV, HBV, and other bloodborne pathogens.

3.4 SOP FOR PREVENTION OF DISEASE(S) CAUSED BY BLOODBORNE PATHOGENS

3.4.1 The NCSBI Crime Laboratory has developed written exposure determinations and maintains a list of all job classifications in which employees have occupational exposure to bloodborne pathogens. All job tasks and procedures are classified into one of three categories to facilitate exposure determination.

a. Exposure Determinations include:

1. Category T1: Tasks that involve potential for mucous membrane or skin contact with blood, body fluids, or tissues, or potential for spills or splashes of them.

2. Category T2: Tasks that involve no exposure to blood, body fluids, or tissues, but employment may require performing unplanned Category I tasks.

3. Category T3: Tasks that involve no exposure to blood, body fluids, or tissues, and Category I tasks are not a condition of employment.

3.4.2 The NCSBI Crime Laboratory establishes work practices and standard operating procedures to eliminate or minimize contact with blood or other potentially infectious materials.

NCSBI Crime Laboratory employees should follow standard operating procedures while performing job duties classified as Category T1 and T2.

3.4.3 The NCSBI Crime Laboratory uses modifications to the work environment and changes in work practices and procedures as the primary method to eliminate or minimize employee exposure.

3.4.4 All NCSBI Crime Laboratory employees who have occupational exposure to bloodborne pathogens will have the hepatitis B vaccination series provided at no charge. This is voluntary.

a. The first dose of vaccine is to be made available to employees within 10 working days of initial assignment. Subsequent doses are to be administered according to current Centers for Disease Control recommendations.

b. Employees who decline hepatitis B vaccine are required to sign a Hepatitis B Vaccine Declination Form and have the option of taking the vaccine at a later date if occupational exposure continues.

3.4.5 The NCSBI Crime Laboratory offers initial, preplacement, annual and new or modified procedures training to all employees who perform Category T1 and T2 tasks. At a minimum, the training covers:

Access to and explanations of the Bloodborne Pathogens Standard,
Information about bloodborne diseases and their transmission,
The agency's exposure control plan,
Job classifications,
Information about Hepatitis B vaccine,
Decontamination and disposal procedures,
Universal blood and body fluid precautions,
Protective equipment, and
Information and protocols for reporting and treatment for an inadvertent exposure to bloodborne pathogens.

3.4.6 The NCSBI Crime Laboratory has implemented a written schedule for cleaning and the method of decontamination based upon the location within or outside the facility (laboratory, clinic, home setting, etc.), type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

Employees are required to clean equipment, environmental and work surfaces and decontaminate them immediately after contact with blood or other body fluids using an EPA- approved disinfectant, such as phenolic or quaternary ammonium germicidal detergent solution or a 1:10 to a 1:100 dilution of bleach.

3.4.7 The NCSBI Crime Laboratory follows the North Carolina medical waste management laws and rules except when the OSHA standard preempts the North Carolina rules because the state rules are less restrictive.

a. North Carolina regulated medical waste is blood and body fluids in individual containers in volumes greater than 20 ml; microbiological waste, such as laboratory cultures and stocks; and pathological waste such as human tissue, organs or body parts. These three types of waste must be treated (rendered nonhazardous by a method such as incineration, steam sterilization, or sanitary sewage disposal for bulk blood of >20 ml per container) prior to disposal with other general solid waste.

1. Sharps or sharp items, including contaminated needles, scalpels, plastic slides and cover slips, broken glass and capillary tubes, ends of dental wires, and other contaminated objects that can penetrate the skin, are regulated medical waste and must be:

a) Packaged in a biohazard-labeled (fluorescent orange or orange-red with lettering or symbols in contrasting color) or red container that is rigid, closable, puncture-resistant and leak-proof (when in an upright position);

b) Sharps containers must be located close to the work areas and replaced before overfilled;

c) During removal of sharps containers from areas of use, they must be closed and placed in a second

biohazard labeled, leak-proof container or a red plastic bag (160 lb. burst strength polyethylene), if there is the possibility of leakage.

2. To avoid unnecessary employee exposure to small volumes of blood (<20 ml) in individual containers, such as laboratory vacuum tubes, they should not be emptied. Containers of ≤ 20 ml of blood that are to be discarded and stored while awaiting off-site transport must be either stored in a secure area, restricted to authorized personnel or packaged in a container suitable for sharps, or in a plastic bag (160 lb. burst strength polyethylene) that is placed in a rigid biohazard-labeled fiberboard box or drum.

b. The NCSBI Crime Laboratory contracts with a Medical Waste disposal company who incinerates (renders nonhazardous) all of the agency's regulated medical waste prior to disposal.

c. Contaminated disposable items, such as dressings, drapes, etc., that would release blood or body fluids in a liquid or semi-liquid state if compressed or items that are caked with dried blood are regulated waste as defined by OSHA. Regulated waste does not require treatment and may be disposed of as general solid waste.

However, while onsite, blood-soaked or caked items must be discarded, stored and transported in red plastic bags or in closable, leak-proof, biohazard labeled containers.

3.4.8 As defined by OSHA, contaminated laundry means laundry that is soiled with blood or body fluids or that may contain sharps.

a. When handling contaminated laundry, employees are to practice universal precautions, including wearing gloves. Contaminated laundry is to be handled as little as possible, with minimum agitation.

b. Contaminated laundry must be placed in red plastic bags or biohazard-labeled, leak-proof containers wherever it is generated. It is not to be sorted or rinsed at the location where it is used.

c. Although contaminated laundry must be handled more carefully and stored in labeled or red bags, it can be washed with the regular laundry.

3.4.9 The Department of Justice has established and maintains a record keeping system that consists of:

a. a confidential medical record for each employee who performs Category I and II tasks, and

b. training records including content, faculty and attendance.

3.5 SOP FOR EMPLOYEE EXPOSURE TO BLOODBORNE PATHOGENS

When an inadvertent percutaneous or permucosal exposure to blood or other potentially infectious materials occur:

3.5.1 Employees are required to:

a. Remove contaminated personal protective equipment and place it in a red or biohazard labeled bag.

b. Wash exposed areas (hands and other skin surfaces) with soap and water. Immediately flush exposed mucous membranes with water, and, if exposed, flush eyes with large amounts of water or eye wash solution.

c. If there is a spill, immediately arrange for decontamination with an EPA-approved disinfectant.

d. Seek medical care if first aid is needed or if signs of infection, such as redness or swelling, occur.

e. Immediately report exposure incident to the direct supervisor and/or section safety officer. If the exposure occurs after 5:00 pm or on a weekend or holiday, the employee should immediately notify the Health Care Provider on an emergency basis.

f. Obtain an Incident Report form from the supervisor. Complete and return it to the supervisor within 24 hours.

When an employee reports an inadvertent percutaneous or permucosal exposure to blood or other potentially infectious materials:

3.5.2 Supervisor and/or section safety officer are required to:

a. Immediately arrange or conduct exposure follow-up.

b. Review standard operating procedures and methods to prevent future exposures with the employee.

c. Provide employee with the Incident Report Form.

4.0 EXPOSURE CONTROL PLAN

The handling of or contact with evidence containing blood or other body fluids poses certain health and safety risks. The degree of risk in most cases is unknown even with information about the victim and suspect.

Exposure to blood borne pathogens is most likely when examining evidence such as liquid blood, syringe needles and other sharp objects, bloody clothing and weapons. Everyone is occasionally required to handle or examine bloody or contaminated evidence, and universal precautions should always be used when in contact with such items.

Key:

Positions Performing Tasks

ADM = Administrator
CLA = Crime Laboratory Analyst/Technician/Intern
ECU = Evidence Control Unit
SEC = Secretary

Fluid Categories Under Universal Blood and Body Fluid Precautions

F1 = Body fluids to which universal precautions apply: blood, blood components, e.g. serum, other body fluids containing visible blood, semen, vaginal fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid.

F2 = Body fluids to which universal blood and blood fluid precautions do not apply (unless there is visible blood): feces, nasal secretions, sputum, sweat, tears, urine, vomitus and saliva.

Protective Barriers Recommended

1 = gloves
2 = gloves and lab coats
3 = Gloves, lab coats and face shields or safety glasses
4 = Gloves, lab coats and safety hood

Task Exposure Category

T1 = Tasks that involve actual or potential for mucous membrane or skin contact with blood, body fluids or tissues. (Refer to F1 or F2 for fluids to which universal precautions apply.)

T2 = Tasks that involve no exposure to blood, body fluids or tissues, but employment may require performing unplanned Category TI tasks.

T3 = Tasks that involve no exposure to blood, body fluids or tissues and Category TI tasks are not a condition of employment.

OSHA Standards will require the following:

1. Contaminated work surfaces will be cleaned at the completion of an operation or at the end of a work day with appropriate cleaning materials.

2. All instruments used with contaminated evidence will be decontaminated within the manufacturers specifications at the conclusion of an operation or at the end of the work day.

3. Gloves must be worn at all times when in contact with contaminated evidence.

4. All personnel must have heptavax (hepatitis B Vaccination) or sign a waiver.

5. All sharps (blades and all glassware) must be disposed of in a hard container.

Exposure Control Plan

Tasks	**Task Exposure Category**	**Position Performing Tasks**	**Categories Under Universal Precautions**	**Protective Barriers Used**
Crime Scene Searches	T1	CLA	F1	3
Handling of all Bloody Evidence (Packaging, Opening, Examination, Evidence Collection, Labeling, Sample and/or Slide Prep., Repackaging, etc.)	T1	CLA ECU	F1	3 or 4
General Evidence Handling (Receiving, Storage, Microscopy, etc.)	T3	CLA, ECU	N/A	0
Suspected Contaminated Evidence	T2	CLA, ECU	F1 or F2	1 or 2
Cleaning Work Surfaces	T2	CLA, ECU	F1 or F2	1 or 2
Reports (Writing, Typing, Reviewing, etc.)	T3	ADM, CLA, ECU, SEC	N/A	0

N/A - Not applicable

5.0 FIRE AND EMERGENCY EVACUATION PLAN

5.1 PURPOSE

To provide a safe and expedient evacuation plan for all employees and visitors of the NCSBI Laboratory Facilities located in Raleigh, Skyland, and Greensboro, North Carolina.

5.2 REQUIREMENTS FOR EVACUATION

A. Anytime a fire, explosion, or hazardous incident (i.e., chemical spill and leaks, radiation leaks etc.) occurs this plan should be implemented.

B. All employees, including contract, temporary, interns and visitors are following the Laboratory's Fire and Emergency Evacuation Procedures provided by each Supervisor through their Section Safety Officer.

B. SAC/Supervisors will ensure the following areas are covered: acquire head count of employees on the complex for their section, and provide pertinent information to the firefighters\rescue personnel (possible employee still in building, type chemicals present, unseen dangers), if necessary.

C. The Assistant Director for the Crime Lab will designate a location for each Section to meet upon evacuating the building. (Each section/unit should state their evacuation location in their respective Section/Unit Policy and Procedure manual.)

D. The emergency alarm system should be tested annually.

5.3 TRAINING

A. A practical evacuation drill should be conducted at least once a year to familiarize all employees with exits, especially emergency exits not normally used, and their safe and efficient use. The Laboratory Safety Committee and SAC/Supervisor's should review all aspects of the practice evacuation drill to determine if any problems occurred and\or improvements of the plan should be implemented. The fire alarm system should be used during all drills to familiarize the employees with the actual alarm system. The fire department should be made aware of the drill prior to its's execution. An Evacuation Drill Evaluation form will be completed after each drill (see Appendix A).

B. NO ONE IS EXEMPT FROM FIRE DRILLS, EXCEPT BY APPROVAL FROM THEIR SAC/SUPERVISOR.

C. All employees should be made aware of where all safety equipment is located while carrying out their normal duties. The employees should be instructed annually on the use of safety equipment

(fire extinguishers, fire alarms, fire escapes, etc.). The training records should be maintained for a period of five years by the section safety officer or by the SBI Training Section.

D. The Section Safety & Chemical Hygiene Officer (S&CHO) should conduct a monthly safety inspection of all emergency equipment, placards and safety exits. The SAC/Supervisor should review the reports regularly to make sure all emergency equipment is being properly maintained and managed by their S&CHO and their section's personnel.

5.4 PROCEDURE FOR EVACUATION

A. At the sound of the fire alarm or activation of the alarm all personnel should do the following:

1. All personnel should turn off all flames and sources of ignition, if possible to do so. If possible, all laboratory instruments should be powered down. If a dangerous source of ignition was not able to turn off, this information should be relayed to your SAC\Supervisor or designee to be reported to the fire fighters\rescue personnel.

2. All personnel should proceed to the closest fire exit in a safe and orderly manner. DO NOT USE ELEVATORS. Upon exiting the building, individuals should proceed to their sections designated location to meet. A count of the number of people present should be compared to the number of people reported in for the day. If a discrepancy occurs, this information should be passed on to the section's SAC\Supervisor, who will in turn tell the Assistant Director of the Crime Lab or his designee. Personnel of the regional laboratories will report to the SAC of the respective laboratory and then notify the Assistant Director of the Crime Lab or his designee.

3. If possible, the SAC\Supervisor designee should sweep the section to make sure all personnel and visitors have exited their section safely.

4. Building Re-entry.

(a) No employee(s) should re-enter the Raleigh facility until the Assistant Director of the Crime Lab or his designee and the Fire Department's Chief or designee have determined the Crime Laboratory building is safe to re-enter.

(b) No employee(s) should re-enter the Regional Laboratory until the specific SAC of that Laboratory or his designee or the Fire Department's Chief or designee have determined that the Laboratory building is safe to re-enter.

B. If a strong storm or tornado is threatening, personnel should be contacted directly (e.g., person to person or via phone) if time allows and all personnel should proceed to a designated safe area of the section, away from all exterior windows. All personnel should remain in this designated safe area until their SAC\Supervisor or designee determines danger is no longer present.

Appendix A -

Evacuation Drill Evaluation-NCSBI Crime Laboratory

Building: _____.

Time: _____.

Date of Drill: _____

Location monitored: _____

Time required for occupants to evacuate (minutes): _____

Number of occupants evacuated at this location: _____

During evacuation:

Did occupants evacuate immediately? _____

Were plans for the mobility-impaired persons implemented? _____

Did occupants evacuate to the approved meeting location? _____

Did Section safety reps report any problems to emergency personnel? _____

Comments:

Name of Reviewer(s):
Mark Boodée – Crime Lab DOJ Safety
Jerry Richardson – Lab Director

Departments/Sections may receive a rating of:

- Good (no additional training or drills)
- Fair (additional training is required)
- Poor (additional training and another drill is required).

Revised October 2007

6.0 AUTOMATED EXTERNAL DEFIBRALLATOR (AED) PROGRAM

The following policy is for the use of an automated external defibrillator (AED), which can be used to treat victims of sudden cardiac arrest. It is only to be applied to victims who are unconscious, not breathing normally and showing no signs of effective circulation. Persons who are breathing normally, coughing and moving should **not** receive AED treatment. When opened, the AED will advise the operator of how to proceed, analyze the heart rhythm and deliver a shock if appropriate.

6.1 AED LOCATION

An AED will be kept in a secure, climate controlled, location near the entrance to the buildings of the Raleigh Crime Lab and the Western Crime Lab. An AED kit will be attached to the unit, and will include a CPR mask, disposable razor, gloves, towel and scissors.

- Raleigh Lab: the AED will be kept in the security guard's office and outside of the second floor conference room.
- Western Lab: the AED will be kept in the administrative supply room.
- Triad Lab: the AED will be kept in the administrative area.

6.2 AUTHORIZED USERS

Any person who has successfully completed CPR and AED training within the past two years is authorized to operate the AED. CPR and AED training will be made available to SBI Lab personnel annually.

6.3 AED RESPONSE PROCEDURE

(For situations where a victim is unconscious, not breathing normally and showing no signs of effective circulation)

A. After the initial assessment of the victim, the person initiating the response will attempt to do the following, or assign someone to do the following:

1. **Call 911** (9-911). Remember to give the building address and location within the building.
2. Call the receptionist or security guard to inform them that 911 has been called, and tell them the location of the victim, so they can direct EMS to that location.
3. Raleigh Lab: If extra responders are present, two of them should coordinate with the security guard and wait outside to direct the ambulance to the lab entrance closest to the victim. (EMS may go to the Support Services loading dock when the front entrance is better)

B. Retrieve the AED. The receptionist or security guard can be asked to bring it to the scene, however, ensuring that EMS is allowed access and directed to the scene is critical. At the Raleigh Lab it is advised that an assistant be sent to retrieve the AED, if possible.

C. If a CPR trained responder is present, initiate CPR until the AED unit arrives.

D. Once the AED unit is retrieved, open the lid of the AED and follow the instructions of the AED unit (audible voice and display). The following procedures may be required before attaching the electrode pads:

1. Remove clothing from victim's chest area (scissors may be used).
2. Use towel to wipe away sweat, dirt, or anything that may interfere with the attachment of the AED electrode pads.
3. Use the razor to remove excessive chest hair if it will interfere with the attachment of the AED electrode pads.

E. Once the electrodes have been attached follow the AED's instructions. Only EMS should remove the electrodes, unless the pads are a danger to the victim.

6.4 POST AED USE

After an AED unit has been used on a victim the following steps will be performed by the Lab Safety Officer or designee:

A. Download and save the data stored in the AED's memory. The data will be reviewed by the physician assisting with the NCSBI's AED program (Dr. Griggs, NCSHP).

B. Return the AED to a state of readiness:
1. Clear the AED's memory.
2. Disinfect the AED. Bleach should not be used, as it may damage the metal connectors.
3. Replace the electrode pads and order replacement spare electrodes.
4. Ensure that the AED indicates it is in a "Ready" state.
5. Replace items in the AED kit that were used.

C. Document the incident in accordance with all NCSBI safety policies.

D. Review the incident with the reviewing physician, EMS and involved rescuers.

6.5 AED MAINTENANCE

Maintenance will be performed by the Lab Safety Officer or designee. The maintenance described in the AED's manual will be performed.

A. The following maintenance is for the Cardiac Science Powerheart AED:

1. Daily Maintenance Check:
   a. Verify the AED's readiness indicator indicates it is "Ready", and the audible alert is not activated. The daily check does not need to be documented.

2. Monthly Maintenance Check:
   a. Open the AED lid.
   b. Wait for the AED to indicate status: observe the change of the STATUS INDICATOR to RED. After approximately 5 seconds, verify that the STATUS INDICATOR returns to GREEN.
   c. Check the expiration date on the electrodes.
   d. Listen for the voice prompts.
   e. Close the lid and confirm that STATUS INDICATOR remains GREEN.
   f. Document monthly maintenance check.

3. Annual Maintenance Check:
   a. Open the AED lid.
   b. Remove the pads.
   c. Close the lid.
   d. Confirm that the STATUS INDICATOR turns red.
   e. Open the lid and confirm that the PAD indicator is lit.
   f. Reconnect the pads and close the lid.
   g. Make sure the expiration date is visible through the clear window of the lid.
   h. Make sure that the STATUS INDICATOR is GREEN.
   1. Open the lid and confirm that no diagnostic indicators are lit.
   j. Check the expiration date of the pads; if expired, replace them.
   k. Check the pads packaging integrity.
   l. Close the lid.
   m. Check the Integrity of the Case.
   n. Document the annual maintenance check.

B. The following maintenance is for the Zoll AED Plus AED:

1. According to Zoll's technical support, no performance maintenance is required on this unit since it does its own internal performance check weekly.

2. According to the AED Plus' Operator's Guide, the AED Plus unit should be checked periodically to ensure that the green check (√) symbol appears in the status indicator window.

3. A monthly check will be performed and recorded on the AED Plus unit as part of the laboratory inspection.

7.0 HAZARDOUS WASTE MANAGEMENT PROGRAM

7.1 INTRODUCTION

With the enactment in 1976 of the Resource Conservation and Recovery Act (RCRA), the transportation, handling, storage and disposal of solid and hazardous wastes became strictly regulated under federal, state and local laws. The Environmental Protection Agency (EPA) and the State of North Carolina have developed regulations for compliance with RCRA. The State's regulations are in some instances more stringent or broader in scope than the EPA regulations. Responsibility for compliance with hazardous waste regulations begins with the person generating the waste material and follows through to disposal. All employees who generate a hazardous waste are obligated to properly manage the hazardous waste in accordance with RCRA regulations. Environmental protection, regulatory requirements, and escalating disposal costs underline the importance of waste generators doing their part to ensure that wastes are properly managed at the Crime Laboratory of the State Bureau of Investigation (SBI).

This Hazardous Waste Management Program (HWMP) serves as a guide for handling hazardous wastes generated at the Crime Laboratory. The goal of the HWMP is to handle hazardous waste in a safe, efficient, and environmentally sound manner and to comply with local and federal regulations. This goal will be achieved through the training of Crime Laboratory personnel, and through the implementation of pollution prevention, waste minimization, recycling and reuse practices. It is the responsibility of the waste generator (Crime Laboratory employee) to properly handle, store, and label all waste material intended for disposal.

7.2 PURPOSE

This HWMP was developed for the SBI's Crime Laboratory full- and part-time employees who may generate, handle or store hazardous chemical wastes. This program provides the framework for hazardous waste determinations, labeling and container management, hazardous waste storage area requirements, contingency planning, employee training, and a clear definition of roles and responsibilities.

7.3 SCOPE

This program applies to each Section of the SBI's Crime Laboratory, including the Western Regional Laboratory in Skyland, NC, and the Triad Regional Laboratory in Greensboro, NC, that generates hazardous wastes. It provides directions for containing, labeling, storage, transportation, inspection, training, and record keeping for hazardous waste activities. Hazardous waste items will not be transported or shipped from one laboratory to another. The HWMP is available to all SBI Crime Laboratory employees at any time through the SBI's Crime Laboratory Safety Manual. Employees will be advised of its availability during their training sessions. A copy of the HWMP will always be

accessible in the office of the Crime Laboratory Safety Officer, and on the Laboratory network, for review and copying.

7.4 CHEMICAL HYGIENE OFFICER

As noted in section 1.3 above, each Section that generates hazardous waste must designate an individual or individuals to be its Chemical Hygiene Officer (CHO). CHOs will be responsible for ensuring that their Sections comply with hazardous waste regulations.

7.5 RESPONSIBILITIES

A. The Laboratory Safety Officer (Chairperson of the Laboratory Safety Committee):
•Maintain the HWMP, based on regulatory changes and the needs of the Laboratory.
•Assist in the implementation of the HWMP in the Laboratory.
•Arrange training for CHOs in the proper handling and disposal of hazardous waste.
•Arrange for the transportation and disposal of hazardous waste from campus whenever necessary.
• Be the central repository for record keeping of all documents related to the accumulation, transportation, storage, treatment, and disposal of hazardous wastes.

B. Special Agents in Charge/Supervisors:
•Designate an individual(s) to be the Chemical Hygiene Officers (CHOs).
•Ensure CHOs receive annual training.
•Ensure that no chemicals are abandoned in the Section.
•Ensure this program is implemented within the Section.

C. Chemical Hygiene Officers (Appointed by the Supervisor):
•Attend initial and annual training in Hazardous Waste Management, if available.
•Assist the Laboratory Safety Officer in implementing the HWMP.
•Establish waste storage areas in the Section with the assistance of Laboratory Safety Officer.
•Assist analysts to properly label, store, and segregate hazardous waste.
• Inspect waste storage areas monthly to ensure hazardous waste is properly labeled, segregated and stored.
•Ensure that designated waste storage areas are posted with a DANGER.
•Contact the Laboratory Safety Officer to collect and remove hazardous waste from the waste storage areas in a timely manner.
•Develop and implement an active waste minimization program by investigating material substitution, scale reduction, chemical exchange, and purchase control.

D. Analysts:
•Become familiar with the HWMP.
•Attend training provided by the Section CHO.
•Identify or deem chemical waste as hazardous waste.
•Work with their CHO to properly label, date, segregate, and store hazardous wastes.

7.6 GENERATOR STATUS

According to regulations set forth by the Environmental Protection Agency under the authority of the Resource Conservation and Recovery Act (RCRA), a generator is defined as "any person, by site, whose act or process produces hazardous waste … or whose act first causes a hazardous waste to become subject to regulation." These regulations subject persons that generate hazardous waste to standards that govern on-site accumulation and off-site transportation of such material.

EPA regulations identify a generator as a conditionally exempt small quantity generator (CESQG) if less than 100 kg/month of hazardous waste is generated per month. Since the SBI Crime Laboratory generates less than 100 kilograms of hazardous waste in a calendar month, the laboratory is classified as a CESQG. As such, the laboratory is exempt from most provisions of RCRA hazardous waste regulations, provided the waste is characterized, the accumulated waste does not exceed specified limits, and waste is either treated or disposed of in an appropriate hazardous waste facility.

As a CESQG, the NCSBI Crime Laboratory is not subject to the accumulation time limits provided the amounts accumulated do not exceed allowable limits (e.g., 1000 of hazardous waste). If this accumulation quantity limit is exceeded, the Laboratory's waste will be regulated as the next generator status level – small quantity generator (SQG). SQGs may accumulate up to 6000 kg of hazardous for only 180 days. Therefore, the SBI Crime Laboratory will strive to maintain CESQG status.

7.7 HAZARDOUS WASTE DETERMINATION

The hallmark of the RCRA hazardous waste program is its "cradle-to-grave" approach to regulating hazardous waste from generation to ultimate disposal. Operations generating any solid waste must determine whether the waste is hazardous. However, for a material to be classified as a hazardous waste, it must first meet the definition of a "solid waste". Under RCRA regulations, a solid waste is defined as any material or combination of materials (solid, semi-solid, liquid, or contained gas) that has been "discarded" (as defined in 40 CFR 261.2) by the generator.

Solid Wastes:
Solid wastes are materials that are no longer used, unwanted and are set aside for disposal. Solid wastes include abandoned items, materials that are ready to be disposed, or those that are ready to be recycled. Materials are solid waste if they are "abandoned" by being disposed of; burned or incinerated; or accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated. Solid wastes may be a solid, liquid, or gas. EPA's regulations on waste also automatically exempt certain solid wastes from being considered hazardous. Among those subject to exemption are agricultural wastes that are returned to the ground as fertilizer, utility wastes from coal combustion, nuclear sources or domestic sewage. EPA has also adopted a conditional exemption for waste samples to be used for testing.

"Inherently Waste-like" Materials:
Chemicals no longer suitable for use are considered "inherently waste-like" materials and are subject to hazardous waste regulations. Some examples include:

- Chemicals that are no longer used, e.g., past the expiration date;
- Chemicals with obliterated labels, e.g., corroded, faded, or smeared;
- Chemicals with no labels, e.g., sample vials, jars, or beakers; or
- Samples that cannot be identified.

Therefore, if a substance is not considered to be "discarded" or a "solid waste", it will not be regulated as a solid waste.

The burden of properly identifying or classifying a solid waste as hazardous falls on the CHO of the Section which generates the waste. Determining whether or not a waste is "hazardous" under RCRA is the next step in proper hazardous waste management.

There are two basic categories of hazardous waste: (1) solid wastes that are listed as hazardous by EPA or by the North Carolina Department of Environment and Natural Resources, and (2) solid wastes which, while not listed, display one of four hazardous "characteristics."

Hazardous Waste:
RCRA defines a hazardous waste as a solid waste that because of its quantity; concentration; or physical, chemical, or infectious characteristics may cause or significantly contribute to an increase in serious; irreversible; or incapacitating, reversible illnesses or pose a substantial present or potential hazard to human health, safety, or welfare to the environment when improperly treated, stored, transported, used, or disposed of or otherwise managed.

Listed Wastes:
By definition, EPA determined that some specific wastes are hazardous. These wastes are incorporated into lists published by the Agency. These lists are organized into three categories:

1. **The F-list** (non-specific source wastes). Because the processes producing these wastes can occur in different sectors of industry, the F-listed wastes are known as wastes from non-specific sources. Wastes included on the F-list can be found in the regulations at 40 CFR §261.31.

   Examples: spent halogenated (such as methylene chloride and chlorobenzene) and non-halogenated solvents (such as zylene, pyridine, acetone and methanol).

2. **The K-list** (source-specific wastes). This list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. Wastes included on the K-list can be found in the regulations at 40 CFR §261.32.

   Examples: not applicable to the Crime Laboratory.

3. **The P-list and the U-list** (discarded commercial chemical products). These lists include specific commercial chemical products in an unused form. Wastes included on the P- and U-lists can be found in the regulations at 40 CFR §261.33.

Examples: P-listed (potassium and sodium cyanides, sodium azide) and U-listed (xylene, tetrahydrofuran, acrylamide, methanol).

If the waste is not a listed waste, the CHO must determine is the waste displays a characteristic that will cause it to be regulated under RCRA. A solid waste is a hazardous waste if it is not excluded from regulations and it exhibits one or more of the hazardous waste characteristics (termed a **characteristic** waste): ignitability, corrosivity, reactivity, or toxicity.

If there is uncertainty as to whether or not a solid waste is hazardous, deem the waste hazardous and apply the HWMP.

A. Characteristics

As noted above, a solid waste is a hazardous waste if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity.

1. Ignitability (EPA Code D001):

A solid waste that has any of the following properties displays the characteristic of ignitability and is considered a hazardous waste:

- A liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, with a flash point below 60°C (140°F);
- A non-liquid, capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes, and when ignited burns so vigorously and persistently that it creates a hazard;
- An ignitable compressed gas, which includes gases that form flammable mixtures at a concentration of 13 percent or less in air; or
- An oxidizer, such as permanganate, inorganic peroxide, or nitrate that readily stimulates combustion of organic materials.

2. Corrosivity (EPA Code D002):

A solid waste that has any of the following properties displays the characteristic of corrosivity and is considered a hazardous waste:

- Is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, using EPA-specified or approved test methods; or
- Is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.25 inch) per year at a test temperature of 55°C (130°F).

3. Reactivity (EPA Code D003):

A solid waste that has any of the following properties displays the characteristic of reactivity and is considered a hazardous waste:

- Is normally unstable and readily undergoes violent change without detonation;
- Reacts violently with water;
- Forms potentially explosive mixtures with water;

•When mixed with water, generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger
•Is a cyanide or sulfide bearing waste that generates toxic gases, vapors, or fumes at a pH between 2 and 12.5;
•Is capable of detonation or explosive reaction when subject to a strong initiating source or if heated in confinement;
•Is readily capable of detonation, explosive decomposition, or reaction at standard temperature and pressure; or
•Is an explosive.

4. Toxicity (EPA Series D):
Materials that fail the test because of the presence of certain heavy metals or organic constituents above regulated levels.

7.8 HAZARDOUS WASTE DETERMINATION

The CHO of each Section is responsible for conducting a hazardous waste determination for all chemicals used within the Section and those which could be considered to be hazardous wastes. This determination will include a Disposal Guide to assist Section personnel in the use, maintenance and disposal of all chemicals used within the Section.

The following chemicals could be hazardous wastes. *Waste components should remain segregated in separate containers:*
• Flammable Solvents
• Chlorinated Solvents (or other halogenated solvents)
• Corrosives
• Acids
• Bases
• Water Reactives
• Pyrophorics (materials that react with air)
• Explosives (materials that may detonate)
• Peroxides and chemicals that form peroxides
• Cyanides and Sulfides (will give off toxic gases when mixed with acids)
• Toxics
• Ignitable liquids (flash points < 140°F / 60°C)
• Heavy Metals
• Carcinogens
• Mutagens
• Teratogens and fetotoxins
• Oil based paint materials (paints, inks, pigments, glazes, dyes)
• Pesticides
• Solvents used for parts cleaning or degreasing
• Paint thinners and paint removing compounds
• Battery acid and other waste acids

• Phenol wastes
• Wastes containing metals such as lead, chromium, silver, or cadmium
• Mercury waste
• Adhesives, cements or lubricants
• Photographic film processing waste
• Ethidium Bromide
• Water treatment chemicals
• Residues of spill materials
• Used oil
• Pesticides
• Unknowns
• Any mixture that includes any of the above

Personnel from each Section should refer to the disposal guide for their respective Section prior to disposal of any hazardous waste or containers.

7.9 WASTES REQURING SPECIAL HANDLING

Toner Cartridges: Many toner cartridges used in office equipment can be refurbished and used again. Return the used cartridge to the Logistics Support Section after your new cartridge is picked up.

Spray paint cans/aerosol cans: Use cans until empty. Do not puncture the empty cans; dispose of in regular trash. If the cans still contain aerosol and are not to be used, handle as hazardous waste.

Recovered Lead Bullets and Fired Cartridge Casings: The Firearms and Toolmarks Section maintain the indoor firing range. Part of this responsibility is the recovery of lead bullets and spent cartridge casings. The Section routinely disposes of these wastes by selling them through North Carolina State Surplus.

Silver Recovery Units: One silver recovery unit is used in the Photography lab of the SBI Crime Laboratory. The unit is processed by a private vendor whenever necessary. Photography personnel inspect the unit weekly and document.

Compressed gas cylinders: Compressed gas cylinders should be returned to the company where originally purchased. Do not throw any compressed gas cylinder in the trash.

7.10 EXAMPLES OF WASTES THAT DO NOT FALL UNDER HWMP

A. Biomedical waste:
The Crime Laboratory is responsible for collecting or disposing of sharps, needles, broken glass or biohazard material. These items must be disposed of by a biomedical waste disposal company.

Infectious waste boxes are the cardboard boxes with the red plastic liners that are used for the disposal of materials that are contaminated with hazardous biological agents or chemicals to include: blood and

bloodstained materials, slides, contaminated broken glassware, absorbent pads, and small quantities of chemicals. Sharps should be collected in red puncture resistant collection containers. The infectious waste boxes are available through the DNA Database Unit and once full should be returned to the Unit for weekly collection and disposal by the biomedical waste disposal vendor

B. Nuclear/radioactive waste:
The Crime Laboratory does not generate and is not responsible for collecting or disposing of radioactive waste.

7.11 HAZARDOUS WASTE HANDLING

Once solid waste is identified as hazardous waste by the generator, the CHO, or the Laboratory Safety Officer, it must be handled in accordance with the HWMP. Hazardous waste must not be: disposed or recycled with other forms of trash or waste, burned or allowed to evaporate into the air, disposed or diluted in water (i.e., down the drain), disposed on or buried in the land.

An appropriate container (bottle, jar, etc.) must be used to accumulate waste. It must be labeled properly, as discussed in Section 7.12, at the time the first drop of waste is added to the container. This is known as *The First Drop Rule*. Hazardous waste containers must be kept closed except when adding or transferring waste and the contents of the containers must be compatible with the container. Hazardous waste containers must be segregated based on the hazards of the waste. Hazardous wastes must be stored in designated waste storage areas; these areas must be equipped with secondary containment in the form of bins or a berm that would contain liquid waste in the event of a spill. A ***DANGER*** sign must be posted at waste storage areas to indicate the presence of hazardous waste. Monthly inspections of the waste storage area are required and the inspection must be documented and maintained.

7.12 LABELING CONTAINERS

A chemical container must be labeled as hazardous waste at the time its content is designated as a hazardous waste. When a hazardous waste is added to a container, it must also be labeled as a hazardous waste at the time the first drop of hazardous waste is added to it. Chemicals that are to be reused should be clearly labeled as such to avoid confusion with hazardous waste. The Laboratory will not remove any material that is not clearly labeled as hazardous waste.

The person who identifies the hazardous waste is responsible for labeling the container that stores the waste with the "Hazardous Waste" sticker or tag supplied by the Laboratory Safety Officer. If a sticker is too large for the container, use a tag in its place. Attach the tag with a rubber band or string. If a mistake is made on the sticker after it has already been attached to the container, use a one-line cross out with initial and date to modify and add the correction. Do not place a new sticker on top of an old sticker – attach a Hazardous Waste tag to the container. Do not change the accumulation start date on the label. If a container already has a label that identifies content and hazards (e.g., a manufacturer's label), try to place the sticker on a location that does not cover that label, or use a tag. Regardless of the label existing

on the container, place a completed hazardous waste sticker or tag on the container once the contents are deemed hazardous waste.

Each label/sticker must contain:

Contact Person:

Whoever generates the waste is deemed the contact person (a.k.a., generator). The person's name should be legibly written into this space on the label.

Section address:

Identify the Section and the Laboratory's address.

EPA ID no./EPA Hazardous Waste no.:

To the best of your ability, identify the hazardous waste number associated with the hazardous waste. This can be found at numerous locations online including http://www.epa.gov/epaoswer/hazwaste/data/form8700/8700-12.pdf and http://www.des.umd.edu/hw/rest/manual/codes.html

Accumulation Start Date:

This is the date the chemical is deemed hazardous waste. It may be the date on which the first drop of waste entered an accumulation container. It may be the date you decide you no longer need to use the chemical. It should not be the purchase date of the chemical.

Hazard Class:

To the best of your ability, identify the hazards associated with the hazardous waste. The hazard information should be identified on the container's label per the OSHA Hazard Communication standard, such as "Flammable", "Corrosive", "Oxidizer", "Toxic", "Reactive", "Carcinogenic".

Chemical and %/Volume:

To the best of your ability, identify the contents of the container. It may contain 100% of one chemical or it may contain a variety of chemicals, e.g., from a laboratory in which the jar was used to accumulate different but compatible compounds. Do not use chemical formulas to identify the contents; write out the chemical names.

Manifest Document Number:

Place to identify the number of the waste on the shipping manifest document.

7.13 WASTE STORAGE AREAS

The Section will designate waste storage areas in locations where waste is generated. The CHO should consult with personnel who work in the room where a potential waste storage area will be located to determine waste generation habits. The waste storage area must be placed next to or near the process that generates the hazardous waste, and the person who operates that process or area must control the hazardous waste placed in the waste storage area.

Waste storage areas can be in a laboratory fume hood, on a countertop, or on the floor (but not in an aisle). They should not be placed in front of or behind doors or windows, blocking means of egress, or suspended from equipment. Aisle space must be maintained to allow the unobstructed movement of emergency equipment and personnel into all areas where waste is stored. Adequate aisle space is determined based on the types of emergency equipment that is necessary to respond to fires, spills,

releases, or explosions of the waste materials on site. Reasonably accessible to the room that houses the waste storage area should be:

- A device capable of summoning emergency assistance, e.g., a telephone or a hand-held two-way radio;
- Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems;
- An internal communications or alarm system capable of providing immediate emergency instruction to personnel who can be affected by the emergency incident;
- Portable fire extinguishers; and,
- Spill control equipment.

The Laboratory Safety Officer will maintain a database of waste storage areas in the building. Designated waste storage areas will be marked with a "**DANGER**" sign distributed by the Laboratory Safety Officer. Waste storage areas can be added or removed based on changes in hazardous waste generation habits.

7.14 CONTAINER MANAGEMENT

Containers used to collect hazardous waste must be compatible with the substance they contain. Glass or Nalgene jars are appropriate for most wastes. Do not use soda bottles, food containers, or other containers that could be confused with consumer products.

To avoid a hazardous chemical reaction, do not place incompatible wastes in the same container. Do not place hazardous waste in an unwashed container that previously held an incompatible material. If you are unsure if a waste is incompatible with the waste in a container or with the container itself, contact the Laboratory Safety Officer for advice.

EPA has published a list of potentially incompatible waste components and materials along with the harmful consequences of mixing those materials together. This list does not include every possible hazardous chemical reaction, but should be used as a guide in packaging and storing these materials.

Keep hazardous waste containers closed unless adding or removing waste. If you use a funnel to transfer waste, remove the funnel after the transfer and close the container. A closed container is one whose contents would not spill if the container were knocked over. Depending on the design of the container, it may be properly closed by firmly applying a screw-on cap, bung, drum ring, cork, etc.

When adding waste to a container, do not completely fill the container. Leave space for the contents to expand. Containers and chemicals may expand or contract based on temperature.

Transfer of hazardous waste is not recommended. If a transfer is necessary, ensure adequate spill response equipment is available, wear personal protective equipment (PPE), and use adequate transferring mechanisms, e.g., a funnel.

7.15 MONTHLY INSPECTIONS

Once a waste storage area has been established, a monthly inspection of that area is required, regardless of the quantity of waste in the storage area. Even if no waste has been added to a storage area, an inspection is still required.

CHOs or their designee are required to perform monthly inspections of waste storage areas, using the inspection form developed by Laboratory Safety Committee (See Appendix A). The Laboratory Safety Officer recommends that each CHO include HWMP inspections as part of their monthly safety inspections. The inspection should be attached to the monthly safety inspection form. Use one form per waste storage area.

If the CHO for a designated waste storage area is not able to complete the monthly inspection due to absence, it is his/her responsibility to ensure the inspection is completed. A database of CHOs, established by the Laboratory Safety Officer, will be available.

7.16 CONTINGENCY PLAN

The HWMP documents the Laboratory's commitment to manage hazardous waste so as to minimize the possibility of a release of hazardous waste into the environment. As part of this commitment, each Section will maintain equipment on-site to facilitate spill cleanup and protect human health. In addition, a list of names, addresses, and phone numbers (office and on-call pager/cell phone) of all persons qualified to act as emergency coordinator will be located in the waste containment area.

7.17 PICK-UP SCHEDULE

As a CESQG, the laboratory is not subject to hazardous waste accumulation time limits provided the amounts accumulated do not exceed allowable limits. However, the Laboratory will strive to maintain a healthful workplace environment by eliminating hazardous waste as frequently as possible.

The Laboratory Safety Officer will coordinate hazardous waste pick-ups for all Sections that generate hazardous waste. A contracted hazardous waste disposal company will be contracted to provide waste pick-ups approximately whenever needed. Section CHOs will evaluate the need for hazardous waste every six months. It is the responsibility of the CHO to contact the Laboratory Safety Officer to arrange a hazardous waste pick-up from the waste storage area. If there is no waste in the waste storage area, there is no need to contact the Laboratory Safety Officer.

7.18 RECORDKEEPING

Document all waste management activities. If you suspect something should be documented, you are probably correct. If you do not think something should be documented, you may be incorrect; so document it regardless. Documentation requirements:

• Monthly inspection forms should be managed by the CHO, filed, and saved for five years.

• All other hazardous waste documentation relating to shipment, regulatory reports, and land disposal records will be maintained by the Laboratory Safety Officer for at least three years.

7.19 WASTE MINIMIZATION

Wherever feasible, the generation of waste is to be reduced or eliminated as expeditiously as possible. Implementing a comprehensive waste minimization program can reduce potential environmental liabilities and help protect the environment through more efficient resource utilization. It also reduces expenses by minimizing waste treatment and disposal costs, raw material purchases, and other operating costs. Benefits of waste minimization include economic savings, increased environmental integrity, decreased exposure to toxic materials, and, possibly, an improved image for the Laboratory.

There are many ways to prevent or minimize hazardous waste generation. This list provides some ideas for waste minimization techniques.

- Maintain a limited inventory of chemicals on hand so those chemicals do not expire or deteriorate and necessitate disposal. Only purchase what is needed.
- Develop a running inventory of chemicals on hand.
- Use the inventory to track unused chemicals for possible use by other Sections.
- Reduce or eliminate the use of highly toxic chemicals.
- Reuse or recycle spent solvents.
- Recover metals from waste solvents.

- Initiate procedures to reduce mercury use; e.g., replace mercury-bearing instruments with alternatives.
- Recycle office equipment such as computer monitors.

7.20 REFERENCES

- Title 40 of the Code of Federal Regulations, Parts 260-268, 270, 273, 279.
- Environmental Protection Agency, Hazardous Waste Regulation, 40 CFR 260
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr260_00.html
- EPA Compatibility Table 40 CFR 264, Appendix V
http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr264_00.html
- OSHA information on carcinogens:
http://www.osha-slc.gov/SLTC/carcinogens/index.html

Appendix A

Hazardous Waste Storage Area Checklist

Monthly Inspection Checklist and Record for _____**(Section Name)**

Name/Title of Inspector: _____Date and Time of Inspection:____

Area(s) Inspected: _____Number of Full Containers: _____

Are All Containers Closed: _____

Condition of Containers:_____
(Do containers show signs of leaking? Is there deterioration due to rust? Have containers been damaged?)

Condition/Integrity of Containment Area: _____
(Will the area effectively contain a spill or leakage? Have berms or other containment device deteriorated or been damaged?)

Is there sufficient aisle space between rows of containers?_____

Is there evidence of spilled material?_____

If there was a spill, list remedial action taken: _____
(Example: Spill was cleaned and leaking drum was replaced.)

Are container labeling requirements satisfied? _____
(Each container in the hazardous waste storage area must be labeled with the following information.)

EPA Label

HAZARDOUS WASTE -Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
The Generator's Name and Address:_____
Generic Waste Shipping Name: _____
Hazard:_____
EPA Waste Code:_____
Date of Containerization:_____
Manifest Document Number:_____

Additional remarks or actions to be taken:

Record this inspection in an inspection log and keep these records for at least three (3) years from the date of inspection.

8.0 OPERATING AND SAFETY PROCEDURES FOR X-RAY PRODUCING EQUIPMENT

8.1 FORWARD

This document addresses the rules and regulations (15A NCAC 11) applying to x-ray tube equipment used by the North Carolina State Bureau of Investigation (SBI) Crime Lab.

These instructions are provided so that the SBI Crime Lab can comply with the state rules for radiation control (15A NCAC 11). The North Carolina Division of Radiation Protection, enforces the radiation rules in North Carolina. These rules require that our radiation machines meet specific requirements. The rules also require that certain procedures be followed and that certain records be kept. A copy of these rules is always available for you to read and review. It is entitled the North Carolina Regulations for Protection Against Radiation (NCRFPAR) and is located with the Radiation Safety Officer (RSO). An electronic version is available on the NCDENR website at www.ncradiation.net . The rules require that each X-ray facility be registered with the State of North Carolina. The Notification of Registration is located with the RSO.

8.2 PURPOSE

The intent of this document is to establish procedures to minimize radiation exposure of personnel. Operators are required to know the procedures and requirements in this document and be able to demonstrate that you can use them properly. After reading this document and demonstrating that you can use the machines safely and correctly, you must sign and date a "Record for Instruction of Individuals in Operating and Safety Procedures".

8.3 SCOPE - COMPANY DATA

North Carolina State Bureau of Investigation Crime Laboratory
121 East Tryon Road
Raleigh, North Carolina 27603

North Carolina State Bureau of Investigation Western Laboratory
9B Walden Ridge Drive
Skyland, North Carolina 28776

North Carolina State Bureau of Investigation Triad Laboratory
Guilford Building
2306 W Meadowview Road Suite 110
Greensboro, NC 27407

8.4 RESPONSIBILITIES

All operators of x-ray machines are responsible for following the radiation safety procedures. The RSO of the SBI Crime Lab has the responsibility and authority for overseeing matters relating to radiation protection. The RSO also confirms all training and serves as the contact person with the North Carolina Department of Environment and Natural Resources (NCDENR), who is responsible for regulating radiation safety. Employees should submit all radiation questions or concerns about radiation safety to the RSO.

The general requirements for radiation safety and your rights and obligations as a radiation worker are found in the NCRFPAR, Section .1600.

8.5 POSTING REQUIREMENTS

There shall be a posting of the State's "Standards for Protection Against Radiation Notices, Instruction and Reports to Workers, Inspections" located in areas where the x-ray unit operators and adjacent employees may read it. All areas where radiation may be emitted are to be posted as such, according to the NCRFPAR section .0411.

8.6 TRAINING

8.6.1 Training on the procedures and operation of radiation producing instruments/equipment will be performed by experienced operators.

8.6.2 The RSO will be responsible for training the concept of ALARA (As Low As is Reasonably Achievable):

- Remember to keep exposure time to a minimum.
- Keep an increased distance between the radiation source and operator.
- Use adequate shielding.

8.7 CHANGES IN INVENTORY

Any time x-ray producing equipment or materials are brought into, or removed from, the Lab the RSO must be notified. The RSO must register all new x-ray producing equipment with NCDENR. NCDENR must be notified before used x-ray equipment is removed from the Crime Lab.

8.8 EMERGENCY PROCEDURES

If there is a need to turn off the unit in an emergency, the main power to the unit should be turned off. The following procedure should be used for the specified instrument:

- Seifert Isovolt 320 DS-1, Industrial X-ray Unit: Turn 'off' the circuit breaker on the east wall.

- Thermo Electrom, QuanX, X-ray Fluorescence Unit: Turn 'off' the key-switch on the front panel of the unit.

8.9 EXCESSIVE EXPOSURE

8.9.1 If you suspect there has been an excessive exposure or a radiation incident, immediately notify the Crime Laboratory RSO. The RSO will then notify the Division of Radiation Protection. The address is:

Division of Radiation Protection
3825 Barrett Drive
Raleigh, North Carolina 27609-7221
(919) 571-4141

The RSO will also immediately notify the Director of the NCSBI, the Assistant Director of Crime Laboratory Services, and the Crime Laboratory Safety Coordinator, of the incident in writing.

8.10 PERSONNEL MONITORING

8.10.1 Operators will always wear personnel monitoring badge(s) when they are working with an x-ray unit. The badge must be assigned to the operator – badges will not be shared.

8.10.2 Dosimeters shall be worn when working with the Industrial X-ray Unit, and the daily readings from the dosimeters logged. Dosimeters are not required for x-ray diffraction or x-ray fluorescence units.

8.10.3 When not in use, store personnel monitoring badges in a low radiation area. The control badge shall be stored in an area representative of normal background radiation.

8.10.4 The RSO is responsible for evaluating the exposure records and ensuring that monitoring badges are exchanged on a routine basis (every three months for TLD type badges). These records will be retained for as long as the Crime Laboratory maintains its license.

8.11 OPERATION OF AN X-RAY UNIT

8.11.1 Try to keep radiation exposure as low as possible. Never allow the unit's lead shielding to be open or any lead panels to be removed when operating the x-ray unit.

8.11.2 All x-ray equipment at the NCSBI Crime Laboratory was installed following the manufacturer's specifications. Do not alter, tamper with, or remove any of the filters,

collimators, shielding, fail-safes, warning systems, or in any way cause needless radiation exposure.

8.12 IRRIDIATION PROCEDURES

8.12.1 Every activity involving the use of the x-ray unit will be logged in the activity log book for the x-ray unit. The log will include the date, time, and operators' initials. The activity logs will be maintained for at least three years.

8.12.2 The x-ray beam shall be disabled when changing samples. The use of forceps or any sample holding device to change the sample while the beam is on, is not permitted.

8.12.3 A physical radiation survey shall be conducted to determine that the radiation machine is "off" prior to each entry into the x-ray exposure area (this is not required for the x-ray diffraction or x-ray fluorescence units).

8.12.4 The procedures for the operation of the instruments are maintained as separate documents. Those procedures will be followed when operating the instrument.

8.13 SYSTEM SECURITY

8.13.1 Access into buildings housing stationary x-ray units is to be controlled at all times.

8.13.2 There shall be appropriate radiation warning signs adjacent to the units.

8.14 INSPECTIONS

8.14.1 X-ray surveys of the area near an x-ray unit must be performed annually, after maintenance is performed that may affect the shielding, or after relocating it.

8.14.2 The RSO or designee is responsible for performing the surveys. The RSO or designee will be notified when maintenance or relocation has occurred.

8.14.3 Records of the surveys must be kept for three years. Survey meters used must be calibrated at intervals not to exceed six months.

Appendix A

RECORD FOR INSTRUCTION OF INDIVIDUALS IN OPERATING AND SAFETY PROCEDURES FOR THE OPERATION OF THE _____.

In accordance with NCRFPAR, these procedures have been made available to each individual who operates the x-ray equipment. I certify that each of the individuals listed has demonstrated to me, on the date indicated, that he/she is competent in these operating and safety procedures and can operate the x-ray equipment in a safe manner. This was demonstrated by operating the x-ray unit under my supervision.

_____
RSO signature

Operator Statement:

I have read the **Operating and Safety Procedures for X-Ray Producing Equipment** procedure and agree to abide by them.

Print Name	Signature	Date	RSO initials
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Revision History		
Effective Date	Revision Number	Reason
August 22, 2003	00	Original Document
November 6, 2006	1.1	1) Update how the Chairman of the Safety Committee is selected, 2) update the address of the Western Laboratory, 3) add Section 6 – AED Program.
December 20, 2007	2.1	1) Added Hazardous Waste Management Program, 2) added Evacuation Drill Evaluation form, 3) added maintenance information for the Zoll AED
December 31, 2008	3.1	1) Updated the manual to reflect the existence of the Triad Regional Laboratory at Sections 1.2, 2.1, 5.1, and 5.4.
September 9, 2009	4.1	1) Removed requirements in Chapter 1 for Deputy Assistant Director. 2) Removed statements in Chapter 2 requiring containers to be labeled so that the hazard is identified, requiring highly toxic chemicals and embryo-toxins be stored in unbreakable secondary containers, and maintained below eye-level; 3) Updated Chapter 7 to include the requirement for Section Safety Officers to generate hazardous waste determinations and disposal guidelines for all chemicals used within the Section, removed requirements that the CHO must post the inspection log, changed that inspection records must be kept for five years, and removed a redundant sentence describing the waste storage area; 4) Added Chapter 8 - Operating and Safety Procedures for X-Ray Producing Equipment
	05	
	06	
	07	