

North Carolina
State Crime Laboratory
EVIDENCE GUIDE

North Carolina State Crime Laboratory
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This guide may be duplicated and distributed to any law enforcement officer whose duties include the collection, preservation, and submission of evidence to the North Carolina State Crime Laboratory.

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SPECIAL NOTICE # 1

EVIDENCE SEALS

All evidence submitted to the North Carolina State Crime Laboratory **must** be in a sealed condition. The only seals which will be accepted are:

- Tape
- Heat Sealed Packages
- Packages with Tamper-Proof Seals

All evidence seals must be initialed by the person sealing the package or placing a seal on the package.

In the case of tape, the initials may be on the tape, under the tape (if the tape is clear), or partly on the tape and extending onto the package surface. But, in any case, the initials must either be on the tape, under the tape, or partially on the tape.

For tamper-proof packages, the initials must be on the seal. For heat sealed packages, the initials must be as close as practical to the seal.

Evidence which does not meet the sealing requirement cannot be accepted for analysis by the North Carolina State Crime Laboratory.

If it is not practical to package a piece of evidence, such as an entire vehicle, the officer or technician submitting that evidence should securely attach a tag to the evidence and initial the tag.

All evidence containers/packages must be sealed to the extent that nothing may be added to or removed from the container/package.

SPECIAL NOTICE # 2

EXPLOSIVES and HAZARDOUS DEVICES

All explosive related evidence shall be hand delivered to the Raleigh Laboratory. If the evidence involves an improvised explosive device (IED), then it is the responsibility of the submitting officer to ensure that the device has been rendered safe by a qualified individual such as a certified bomb technician, an EOD specialist, or a member of the SBI Hazardous Device Unit.

When explosive or hazardous device evidence will be submitted to the Laboratory, one of the following individuals should be contacted **prior to submission to ensure that proper personnel will be on hand at the time of submission:**

- Evidence Control Unit Supervisor
919-662-4500 (Ext. 1216)
- Forensic Scientist Manager
Trace Evidence Section
919-662-4500 (Ext. 3520)

Extra precaution must be taken when handling materials such as flash powder and blasting caps. These materials are shock, friction and spark sensitive. If there are any questions regarding the submission of explosive or hazardous device evidence, contact the Forensic Scientist Manager of the Trace Evidence Section before arriving at the Laboratory with the evidence.

SPECIAL NOTICE # 3

The North Carolina State Crime Laboratory receives evidence from over 600 investigating agencies spanning 100 counties. The Laboratory's goal is to continually provide state of the art forensic technology in the timeliest manner possible.

In order to meet this goal, the following Evidence Guide has been established.

EVIDENCE SUBMISSION GUIDELINES

Initial and subsequent submissions shall be limited in the quantities set out herein so as to prioritize items of evidence and facilitate timely analysis. Laboratory representatives in each forensic discipline shall be available to discuss potential submissions with local law enforcement officials.

Pursuant to Special Notice # 5 below, exceptions to the numerical limitations and other submission requirements set out in this notice shall be permitted upon approval of the applicable Forensic Scientist Section Manager. The Crime Laboratory Director or designee shall have the final decision.

The type and number of items accepted per submission shall be based on case type. An item is defined as one article of evidence or a maximum of two swabbings/cuttings that have been collected from the same area where the intent is to combine these swabbings/cuttings. In those instances where multiple swabbings have been taken from an item of evidence, each swabbing shall be treated as an item of evidence (ex.: 15 swabbings from a firearm would be treated as 15 items of evidence).

For all case types, known standards from victim(s) or subject(s) shall not count against the number of items that may be submitted.

Evidence shall be limited per submission to the following:

Homicides

- 10 items for the first submission
- 5 items for subsequent submissions

Sexual Assault Cases

- For the first submission, the sexual assault kit, one pair of underwear (If not contained in kit), and a condom if applicable
- For subsequent submissions, up to 3 items of clothing and/or bed linens

Crimes against the Person

- 5 items for the first submission
- 5 items for subsequent submissions

Other Crimes

- 5 items for the first submission
- 5 items for subsequent submissions

The item number limitation shall be per type of examination requested (i.e., 5 items for the first DNA analysis submission, 5 items for the first firearm analysis submission, 5 items for the first latent evidence submission does not

exceed the 10 item limitation in a homicide case).

All Laboratory Sections are required to return evidence un-worked due to the following circumstances:

- The items have been improperly packaged or preserved prior to submission;
- The items appear to have been contaminated;
- The evidence has been examined prior to submission by the submitting agency or another independent testing lab (e.g., items of evidence which have been tested for the presence of semen will not be accepted for examination by the Forensic Biology Section) (Note: A phenolphthalein test shall not be considered a prior examination for the purposes of submitting evidence.);
- Cases in which a standard needed for comparison is not submitted at the time of intake shall not be accepted by the Evidence Control Unit; and
- Digital evidence (computers, cellular phones, etc.) that is submitted without either a search warrant, court order, letter of consent or prior written approval from the applicable Forensic Scientist Manager shall not be accepted by the Evidence Control Unit.

SPECIAL NOTICE # 4

GUIDELINES FOR REQUESTING EXPEDITED ANALYSIS

In certain exigent circumstances, the examination of evidence may need to be expedited (e.g., public safety concerns during an ongoing investigation where a suspect may be at large and evidence analysis is required for apprehension, or the trial involving the evidence is already scheduled in the near future). In such an instance, the State Crime Laboratory shall consider a written rush request by the elected District Attorney's Office in the format set out at the link noted below explaining the precise justification for the request. (e.g., "case being sent to Grand Jury" does NOT constitute an adequate basis for a rush request.) In certain exigent circumstances, a written rush request may be submitted by the submitting agency's Chief of Police, Elected Sheriff or the SBI Special Agent in Charge of the District in which the incident occurred.

Not every rush request may be honored. A proper written rush request (in the format linked below and also found in Forensic Advantage) shall be directed to the Forensic Scientist Manager of the appropriate Laboratory Section. The final decision on whether to accord rush status to a case shall be that of the Laboratory Director or designee.

If possible, rush requests should be submitted 60 days or more prior to the scheduled court date. This time frame will allow adequate time for evidence processing.

For cases in which a standard needed for comparison is not submitted, the individual who initiated the rush request shall be contacted by the Laboratory. The requestor shall be given three business days to provide the required standards or a reasonable explanation as to why the required standard is not immediately available. If the required items or explanation are not received within three days, the case shall not be expedited and the requestor so notified. Once all required evidence is received and the authorization of the Section Manager is obtained, the case shall be assigned rush status and accorded priority for analysis.

RUSH REQUEST

<http://ncdoj.gov/About-DOJ/State-Bureau-of-Investigation/Crime-Lab/ISO-Procedures.aspx>

SPECIAL NOTICE # 5

EVIDENCE SUBMISSION LIMITATION EXCEPTION

In certain circumstances, the applicable Forensic Scientist Manager may allow an exception to a specific numerical evidence submission limitation or to other evidence submission restrictions set out in this Evidence Guide. A request for exception shall be made in writing by the elected District Attorney's Office and shall set out adequate justification to allow the exception. The final decision on whether to allow an exception shall be that of the Laboratory Director or designee.

Where to Submit Evidence

Submit Evidence to the
Laboratory Serving Your Area:

North Carolina State Crime Laboratory
Post Office Box 2000
Garner, North Carolina
27529-2000
(919) 662-4500 (Ext. 1501)

Commercial deliveries only, use:

121 East Tryon Road
Raleigh, North Carolina 27603
Attention: Evidence Control

Western Regional Laboratory
Post Office Box 2408
Skyland, North Carolina
28776-2408
(828) 654-0525

Commercial deliveries only, use:

9B Walden Ridge Drive
Asheville, North Carolina 28803

Note: The Western Regional Laboratory only accepts
Drugs, Latent, Firearms Evidence and Fire Debris Analysis.
For a list of counties serviced by the Western Laboratory; please see page 7.

Triad Regional Laboratory
2306 West Meadowview Road, Suite 110
Greensboro, North Carolina 27407

The above address is to be used for all mail deliveries.

Note: The Triad Regional Laboratory only accepts
Drugs, Toxicology, Latent and Computer Evidence.
For a list of counties serviced by the Triad Regional Laboratory; please see page 11.

Should there be any questions about which Laboratory handles evidence, please call any location of the Laboratory for assistance **prior** to submitting the evidence.

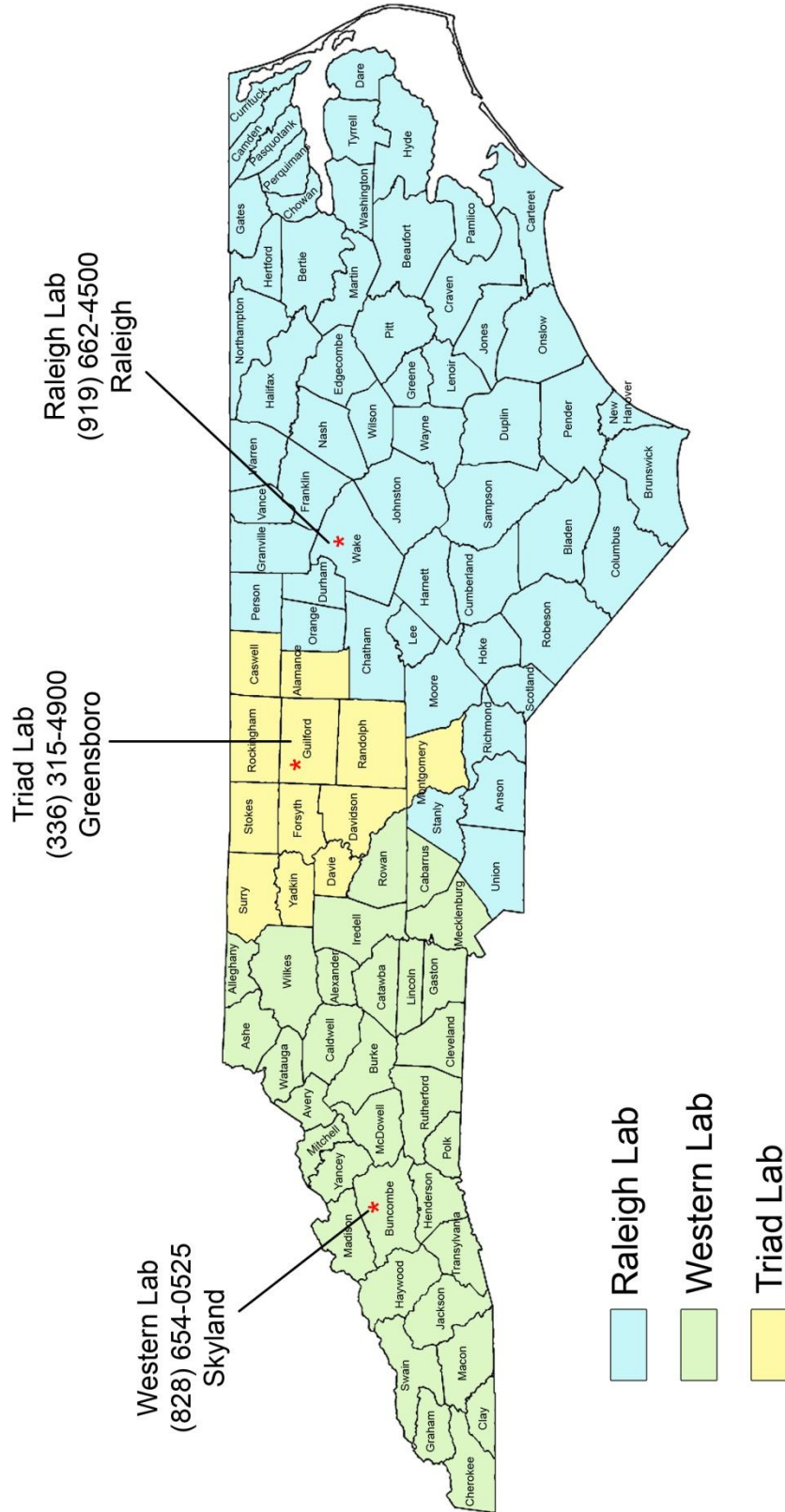
The State Crime Laboratory is moving toward total online evidence submission and reporting. A website is available for this process as well as instructions on how to complete the process. Please contact the Supervisor of the Evidence Control Unit at (919) 662-4500 for further information.

Western Regional Laboratory provides service for the following counties:

Alexander	Iredell
Alleghany	Jackson
Ashe	Lincoln
Avery	Macon
Buncombe	Madison
Burke	McDowell
Cabarrus	Mecklenburg
Caldwell	Mitchell
Catawba	Polk
Cherokee	Rowan
Clay	Rutherford
Cleveland	Swain
Gaston	Transylvania
Graham	Watauga
Haywood	Wilkes
Henderson	Yancey

Triad Regional Laboratory provides service for the following counties:

Alamance	Montgomery
Caswell	Randolph
Davie	Rockingham
Davidson	Stokes
Forsyth	Surry
Guilford	Yadkin



North Carolina State Crime Laboratory

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If you need field assistance prior to collecting or submitting evidence:

The North Carolina State Bureau of Investigation maintains District Offices located across the state. Assistance is available to any law enforcement agency in the state for processing crime scenes and collecting evidence. Each SBI District Office has at least one crime scene search specialist whose primary purpose is to assist law enforcement agencies in the proper location, collection, preservation, and packaging of evidence at crime scenes.

Crime scene assistance should be requested through the appropriate SBI District Office.

In certain cases, additional technical field assistance may be available from the Crime Laboratory; however, the appropriate SBI District Office generally should be contacted first.

If assistance is needed after regular working hours, the request may be made through the SBI Operations Center at 919-662-4500. Information as to which SBI District Office serves particular area is also available at 919-662-4500.

EVIDENCE CONTROL UNIT

Evidence Control Units in the Raleigh Laboratory and the Western and Triad Regional Laboratories ensure proper evidence flow and tracking. The Evidence Control Units receive, distribute and return all evidence processed by the State Crime Laboratory.

Evidence Technicians, and other approved personnel, receive and store all evidence submitted to the Laboratory after the case information is logged into the Laboratory's Forensic Advantage (FA) system. The evidence is transferred to the appropriate Laboratory analyst(s) for analysis upon request. Generally, the submitting officer will not meet directly with the analyst who will conduct the analysis. Exceptions to this practice may be made for individual cases when circumstances require the submitting officer to talk directly with the analyst(s). If there is a special need to discuss certain aspects of a case, a meeting with the analyst(s) may be requested.

EVIDENCE ACCEPTANCE POLICY

The State Crime Laboratory accepts evidence which meets the following criteria:

- The evidence has been obtained as the result of an official criminal investigation.
- The submitting agency is a law enforcement agency or company/campus police agency certified or commissioned through the North Carolina Criminal Justice Education and Training Standards Commission, The North Carolina Sheriffs' Education and Training Standards Commission or the North Carolina Company and Campus Police Program.
- The investigating officer intends to pursue a criminal case pending the results of evidence analysis and/or the related investigation.
- The evidence has not been previously examined by another analyst or laboratory, unless prior approval has been requested and received from the Crime Laboratory Director.

EVIDENCE SUBMISSION PROCEDURES

Adherence to proper evidence submission procedures is essential for analysts to evaluate evidence properly, to maintain the chain of custody, and to maintain the physical integrity and evidentiary value of submitted items. Failure to follow the Laboratory's instructions when submitting evidence could result in the evidence being returned unanalyzed.

Should there be any questions as to the proper evidence submission procedures, it is always best to call the Laboratory first.

Submission Forms

- Attached to each Request for Examination of Physical Evidence form is an instruction sheet with numerous submission highlights. Please read the instruction page in its entirety before completing the form.
- Fill out the Request for Examination of Physical Evidence form **completely**, supplying all information requested. Be sure to complete Parts B, C and/or D as instructed.
- Use a Request for Examination of Physical Evidence Continuation Page when needed. Both forms and Continuation forms are available on-line at the following address:

<http://ncdoj.gov/About-DOJ/State-Bureau-of-Investigation/Crime-Lab/ISO-Procedures.aspx>

The Supplement for Computer Forensics Requests must be completed on all computer forensics requests. The form must indicate the legal authority by which the computer evidence was seized and a copy of the legal documentation (search warrant, court order, etc.) must be attached to the form.

The chain of custody of each piece of evidence submitted must be tracked while in the possession of the Laboratory; therefore, do NOT use separate page(s) for itemization of the evidence.

Type the form or print it legibly.

- Do not allow submission forms, packages, or other cases being transported, to become contaminated by biological or other potentially hazardous evidence. Keep all submission documents and other evidence away from contaminated evidence when preparing evidence for submission to the Laboratory or transporting evidence to the Laboratory. For safety reasons, stained submission documents will not be accepted by the Laboratory.
- Some considerations for completing the form include:
 - (1) **Requesting Officer:** Please use the same officer for all submissions in a given case. This simplifies keeping case records together, as well as grouping submissions on the Laboratory report. The Laboratory always returns evidence to the **Requesting officer** unless otherwise specified on the Request for Examination of Physical Evidence form.
 - (2) **SBI File #:** When an SBI Field Agent is involved with a case, supply that agent's file number (both new and old number when applicable). Indicate on the Request for Examination of Physical Evidence form, the CAA (Case Agent Assigned) and the DIC (SBI District Office in Charge) - this information is available from the SBI Field Agent.
 - (3) **Lab #:** If evidence has previously been submitted in a case and you know the Laboratory number, please provide that number. If you do not know the specific number, please advise the Laboratory that other evidence has been submitted in the case.
 - (4) **Age/Sex/Race:** Provide this information for all suspects and victims as it is pertinent to several kinds of Laboratory analyses. If an individual's date of birth is unknown, provide the best estimate of the person's age.
 - (5) **Analysis Requested:** Be as specific as possible. If not sure of what tests may be performed, please call the Laboratory prior to completing the form, or refer to the appropriate sections of this guide for

- further information. Clearly state the analysis required for each item of evidence. Clarify the request if necessary by stating what you need to know from the analysis on the bottom of the form or on a separate sheet of paper. The Laboratory will not arbitrarily examine evidence without a specific request for each forensic discipline needed clearly requested on the Request for Examination of Physical Evidence form.
- (6) **Origin of Evidence:** Give the exact location where the evidence was seized or collected, (e.g., victim (name), suspect (name), bedroom, vehicle, etc.) The address does not help the scientist, but whose residence does help. **Note: For the safety of all who might handle the evidence, always indicate when evidence was recovered or seized from a body cavity or contaminated area.**
 - (7) **Disposition of Evidence:** The Laboratory is not a long term storage facility. Bulky evidence, large quantities of controlled substances, and some hazardous material evidence will be retained with the understanding that it **must** be picked up by the submitting agency within fifteen days.
 - (8) **Remarks or Synopsis:** Briefly describe in Part B of the submission form what reportedly happened. Supply sufficient detail to illustrate how the evidence submitted relates to the investigation. A copy of the investigative report may suffice if it contains that information. Be sure to specify why each item is being submitted so that analysts may conduct appropriate examinations.
 - (9) By submitting this form, you acknowledge and approve Laboratory personnel to use the most appropriate and up to date methods authorized by our Laboratory and/or, if necessary in the judgment of the Laboratory, sample submission to another Laboratory.

Evidence Packaging

- Package and seal each item individually as appropriate for that type of evidence. See specific sections of this guide for more detailed instructions. One basic rule of evidence packaging is:

Do not use plastic bags for bloody clothing or undried plant material.

- Mark each item with the item number you listed on the Request for Examination of Physical Evidence form, your name or initials, and your case number. Complex item numbers which include both letters and numbers (e.g., FRM-1-360) create tracking problems within the Laboratory. Please limit item numbers to simple numbers which run in numerical order.
- Seal and package evidence with protective padding to prevent breakage, leakage, cross-contamination, or deterioration. Note: An evidence package is considered sealed only if its contents cannot readily escape and if entering the container will result in obvious damage/alteration to the seal. **Stapled or zip-locked seals are not proper seals.**

REMEMBER: All seals must be initialed (with permanent ink) by the individual sealing the evidence and the initials must be on or under the tape. It is a good idea to initial the seal in such a manner that the initials extend off of the tape onto the package.

- When possible, place all sealed items that will be processed by a single Laboratory Section into one container (e.g., envelope, bag, box) and seal that container. For example, in a drug case involving four separate items, seal each item individually and then place it together with the other three into one larger container. Label the container indicating which items are inside.
- If numerous items in a case are submitted for examination by separate Sections of the Laboratory, divide the items into sealed containers according to the Laboratory Sections that will receive the evidence. This helps to

maintain the chain of custody so that persons in the chain, but not involved in evidence analysis, need not open and mark each individual item.

In-Person Submissions

- Bring the copy of the evidence submission form to the Laboratory. The form will be signed showing transfer of the evidence to the Laboratory, and a copy will be returned to you as a receipt. Due to the heavy volume of incoming evidence, Laboratory personnel will not sign other agencies' receipts.
- Personal delivery of evidence is the preferred method for any computer evidence, perishable evidence, cash or items of significant monetary value, firearms, and large quantities of controlled substances.
- **Weapons should be unloaded prior to submission; however, if the weapon is loaded due to a technical reason, advise lab personnel immediately upon your arrival. See Firearms guidelines.**
- When a weapon is submitted to the Laboratory, it will be inspected to ensure the weapon is unloaded and safe prior to receipt.

If a weapon cannot be unloaded or should not be unloaded for technical reasons, the assistance of a Firearms Examiner will be made available.

Mail Submissions

- Only enclose evidence from one case per package. Generally speaking, a case is defined as an incident. Do not package or mail multiple cases (or incidents) together.
- Place all sealed, packaged items into a strong, suitable sized cardboard box. An envelope may be used if there is no danger of damage from rough postal handling.

Pad the evidence to prevent shifting or damage during mail handling. Seal the container adequately with strong tape and **initial the seals**. Wrap boxes with brown paper whenever possible.

- Place a copy of the submission form into an envelope addressed to the correct Laboratory location, and make sure the appropriate return address is clearly indicated. Tape this envelope to the **outside** of the evidence package. Keep a copy for your records.
- Mark the outside of the package Attention: Evidence Control. **Do not indicate drugs, firearms, or victim/suspect names on the outside of the package.**
- Apply proper postage and send via first class mail or appropriate commercial carrier. Live ammunition and weapons have strict shipping requirements. Be sure to check with the shipper on these restrictions prior to mailing these types of evidence.
- Any package containing biological materials or materials exposed to biological contamination **must** be properly identified as **BIOLOGICAL HAZARDS**. The USPS should be contacted with any questions regarding the mailing of evidence of this nature.

Evidence Submission Checklist

- Are the evidence submission forms **completely** filled out including the supplemental form and Parts B, C and D as instructed?

- Is there an original submission form for the Laboratory and a copy for you?
- Have you indicated the type analysis needed for each item of evidence?
- Is each item of evidence separately marked, packaged separately and sealed? Are the seals initialed?
- Is the overall package properly sealed and marked? Are the seals initialed?
- Is the Laboratory copy of the submission form in an envelope attached to the **outside** of the main package so that the sealed evidence package will not have to be opened to remove the form?
- Is your return address legible?
- Has the appropriate postage been affixed?

Change in Case Status/Information

If the status of a case or the progress of an investigation changes and there is no longer a need for the evidence to be analyzed, please advise the appropriate Laboratory of the change via FA web or fax to the Raleigh Laboratory at (919) 661-5849, to the Western Regional Laboratory at (828) 654-9682 and to the Triad Regional Laboratory at (336) 315-4956. Prompt notification that the analysis is no longer needed frees valuable analysis time for other cases.

Requests to correct erroneous information after submitting the original Request for Examination of Physical Evidence form may be made in writing or via telephone conversation by the officer or agent who made the initial request. Such requests may also be made via fax to the Raleigh Laboratory at (919) 661-5849, to the Western Regional Laboratory at (828) 654-9682 and to the Triad Regional Laboratory at (336) 315-4956. The request must refer to the erroneous information which appeared on the submitted form and specify the appropriate change(s).

Protection of Evidence from Deleterious Change

It is the responsibility of the Laboratory to ensure, insofar as reasonable and possible, that evidence does not undergo deleterious change while in our possession.

However, proper collection and packaging of evidence are the responsibility of the submitting officer. One of the purposes of this field guide is to make investigators aware of how to handle certain evidence to prevent deterioration prior to its submission to the Laboratory.

When an officer delivers evidence packaged in such a condition or in a container in which the evidence may be subject to deterioration, he/she may be asked to repackage the evidence prior to submission.

DRUG CHEMISTRY AND TOXICOLOGY SECTION

Capabilities and Services

- Analyses to determine the presence of controlled substances
- Analyses of alcohol and/or other volatiles in blood in DWI cases
- Analyses of impairing substances in blood in DWI cases
- Analysis of non tax-paid alcohol
- Clandestine laboratory investigations

Evidence Submission Guidelines

The Drug Chemistry Section accepts evidence if a criminal arrest has been made or is anticipated. Evidence from concerned parents, schools, organizations, private citizens; found property, or evidence that has no value for criminal prosecution will not be accepted.

- No misdemeanor cases of any kind (except Toxicology evidence), residue amounts, or hypodermic syringes shall be accepted without the prior written approval of the Forensic Scientist Manager of the Drug Chemistry Section (Raleigh Lab) or the Regional Laboratory Forensic Scientist Manager.
- Do not submit any items for which the person of interest will not be charged.
- Evidence should be submitted by United States mail, commercial carrier (such as UPS), or in person.
- Personal delivery represents the safest method of submitting evidence to the Laboratory. When submitting sizable quantities of any drug, arranging an appointment for personal delivery will ensure a more expeditious receipt of the evidence.
- The Request for Examination of Physical Evidence form must be completely filled out prior to submission. If the evidence is to be mailed to the Laboratory, an envelope containing the Request for Examination of Physical Evidence form must be attached to the outside of the evidence. For security reasons, do not label the outside packaging "Drugs" or "Drug Evidence."
- Drug evidence seized from different individuals should be submitted on separate Request for Examination of Physical Evidence forms, even if they were arrested at the same time or at the same incident. This procedure will result in separate Laboratory reports being issued for each individual, which will avoid the potential for problems and confusion in subsequent judicial proceedings.
- Drug evidence seized from the same individual on different dates should be submitted on separate Request for Examination of Physical Evidence forms.
- Evidence seized from body cavities or evidence contaminated with blood, body fluids or biological waste should be clearly marked as a biohazard and notations concerning this evidence should be made on the Request for Examination of Physical Evidence form. The submitting officer should make every attempt to remove contaminated packaging and submit the evidence in clean bags.

- Numbers must be used when labeling items of evidence. Do not use letters or Roman numerals.
- Omit submitting drug paraphernalia, powder residues and cigarette butts.
- Items must be properly separated and sealed to preserve the integrity of each. Place each item in a separate container and then seal all items into one container for submission to the Laboratory.
- Excessive use of tape on evidence packages should be avoided. Close and seal evidence containers carefully, but not so as to make them difficult to open without damaging the contents.
- Tablets or cigarettes must never be enclosed in tape.
- Used field test kits will neither be accepted nor examined by the Laboratory.
- Sending plants (including mushrooms and cacti) to the Laboratory should be avoided unless they have been thoroughly dried. Green plants which are sealed in plastic bags will decompose and will not be able to be examined.
- Entire plants and plants with the roots still attached should not be sent to the Laboratory; submit a representative sample.
- Non-controlled items (e.g., aspirin) should not be sent to the Laboratory.
- When submitting items containing suspected controlled substances for latent print and drug analysis, separate the suspected controlled substance evidence from the latent print evidence prior to submission.
- The inherent dangers of hypodermic syringes, including the transmittal of disease (AIDS, hepatitis, etc.) are significant. The Drug Chemistry Section will not accept hypodermic syringes for analysis unless a written request for analysis is made by the elected District Attorney's Office indicating that the evidence is essential to a criminal prosecution.

One exception to this guideline applies to commercially prepared hypodermic syringes (*Tubex, Carpuject, etc.*) which contain a pharmaceutical preparation and the request for analysis is to determine dilution/substitution of the pharmaceutical preparation.

Limitations to Evidence Submission

- The Drug Chemistry Section generally will not identify more than two items from the same schedule of the Controlled Substances Act per suspect in any given case unless the analysis of the additional items will shift the charge from a misdemeanor to a felony (as in the case of marijuana or Schedule II, III, and IV substances) or to a trafficking charge.
- When two or more individuals are charged collectively with the same items, the group will be treated as a single individual for purposes of analysis.
- Because the Laboratory has a very limited storage capacity, bulk quantities of controlled substances will be sampled or analyzed by a chemist and returned to the submitting officer on the same day. To ensure that a chemist is available, contact the Drug Chemistry Section for an appointment before transporting evidence to the Laboratory.
- Evidence in product liability cases, drug residues on U.S. currency, and cases involving stomach contents

(lavage) will not be analyzed.

- The circumstances surrounding suspected poisoning must be carefully evaluated. The Drug Chemistry Section will not accept poison cases unless prior approval has been obtained from the Section Forensic Scientist Manager. The Laboratory does not analyze for bacterial toxins, which occur when food spoils. County Health Departments, the North Carolina Department of Health and Human Services (Laboratory Services Division) and the North Carolina Department of Agriculture (Food and Drug Protection Division) laboratories analyze for bacterial toxins. Complaints of bad-tasting food or beverages do not warrant submission of items to the Laboratory and such items shall neither be accepted nor examined.

Drug Dilution/substitution Cases

- When submitting injectable liquids for dilution analysis, a control sample of each type of drug in question must be submitted.
- Make sure the control sample is from the same manufacturer and is of the same dosage level (concentration) as the questioned sample.

Non Tax-paid Alcohol Cases

- The Drug Chemistry Section determines ethanol, methanol, and isopropanol concentrations for illegally manufactured liquor. In cases dealing with multiple buys or numerous samples from the same source, only two random samples will be analyzed.
- Alcohol analysis requires only small samples of the suspected liquor. Submit only a 5 ml sample for analysis. The Laboratory will provide small sampling vials if needed.

Toxicology Cases

The Toxicology Unit of the Drug Chemistry Section analyzes blood to determine the presence of alcohol, other volatiles, and/or impairing substances in DWI cases. Analysis of blood to determine the presence of alcohol, other volatile and/or impairing substances in other criminal cases will be done at the written request of the elected District Attorney's Office.

The Toxicology Unit will **not** screen blood for impairing substances when the blood has an alcohol concentration above the statutory minimum to show impairment (0.08 gram of alcohol per 100 milliliters of whole blood) except in cases involving personal injury to someone other than the suspect and a request has been made for a drug screen. A request for exemption from this rule must come from the elected District Attorney's Office and be approved by the Forensic Scientist Manager. A form letter submitted with the evidence prior to any knowledge of blood alcohol results, does not qualify as a valid request for blood drug analysis.

The Toxicology Unit does not conduct employee screening for controlled substances or participate in drug monitoring programs. Blood or urine samples related to such programs will not be accepted for analysis.

The Office of the Chief Medical Examiner conducts all analyses related to death investigations. Postmortem evidence, including drug paraphernalia and controlled substances found with a deceased person, should be submitted to the Toxicologist in the Chief Medical Examiner's Office.

Blood Specimens

Please observe the following guidelines when submitting blood for analysis:

- Submit all blood in commercially available kits such as *Vacutainer* or *Venोजect*. Use only kits which contain a preservative and an anticoagulant (gray top test tubes).
- Do not submit dried blood samples. The Toxicology Unit cannot test dried blood samples for alcohol or drugs.
- Be sure the person taking the blood sample does not leave the needle or other unnecessary items in the kit.
- Use the protective packaging included with the kit for submission to the Toxicology Unit of the Drug Chemistry Section.
- Collect 20 ml of blood in two 10 ml test tubes from the suspect as soon as possible after the incident in question.
- Do not send blood collection kits from different suspects as part of the same evidence submission.
- Storage of blood or urine samples in a refrigerator is recommended to protect against exposure to heat.
- Indicate any suspected impairing substance being used by the suspect on the Request for Examination of Physical Evidence form when submitting the suspect's blood for analysis.
- After the analysis is completed, toxicology evidence will be retained by the Laboratory until the case is completed in the trial court and not on appeal unless otherwise dictated by the submitting agency.

Urine Specimens

- Collect and submit urine and blood samples in drug facilitated assault/rape cases.
- Do not submit urine samples for DWI cases, except when testing for GHB (gamma hydroxy butyric acid) and/or cannabimimetic compounds are requested.
- Use a leak proof container placed in a zip-lock type plastic bag when submitting a urine sample.
- Collect at least 20 milliliters of urine for analysis.

LATENT EVIDENCE SECTION

Services

The Latent Evidence Section provides assistance in the analysis of any item of evidence which falls into one or more of the following categories:

- **Latent Fingerprints**
- **Latent Palm prints**
- **Latent Footprints (bare feet)**
- **Footwear Impressions**
- **Tire Impressions**
- **Other Impressions (gloves, etc.)**

Although the term “latent” refers to hidden or invisible impressions, the Latent Evidence Section also accepts and analyzes “patent” (visible) impressions. Please note that throughout the following guidelines, “latent” refers to both visible and invisible impressions.

Latent fingerprints, palm prints, and footprints may be of sufficient value for identification purposes based on the scientific improbability of two friction ridge skin formations being exactly the same.

On much the same premise as fingerprint identification, tire and footwear examination results are judged on a track’s uniqueness, individuality, and class characteristics. Identifications may be made in footwear and tire track cases.

In conjunction with the Office of the Chief Medical Examiner, the Latent Evidence Section provides assistance in the identification of unknown deceased individuals. For such assistance, contact the Latent Evidence Section on a case-by-case basis.

The Section also provides limited technical field assistance in the collecting of latent prints, footwear impressions, and/or tire impressions. Please contact the appropriate SBI District Office’s Crime Scene Search Specialist and allow him/her to review the scene and to determine if additional Laboratory assistance needs to be requested.

Evidence Submission

Latent Fingerprints, Palm prints, and Footprints

Some of the factors affecting latent prints and their quality include the surface material containing the latent print(s); the amount of perspiration, oils, and foreign matter on fingerprint ridges; weather conditions; pressure; duration; and the handling of the item containing the latent fingerprint(s). Latent prints are very fragile; therefore, extreme care should be used when handling any item suspected of containing latent prints.

If evidence is processed at the scene and latent lifts or photographs of this evidence will be submitted to the Latent Evidence Section, keep the following in mind:

- Develop a routine or pattern in fingerprint processing to ensure each scene is completely examined. Entrance and exit areas, if known, are of primary importance. **First**, search the scene for tire and footwear impressions, then for latent prints. Also, examine other areas believed to have been occupied by the suspect(s).
- Articles that appear to have been moved or disturbed may also indicate a suspect's movement. However, the suspect may have been careful not to leave impressions, so make attempts to locate and process any of these articles.
- Always process surfaces suspected to have been handled, even if the evidence has a surface believed to be a poor medium for latent prints.
- Most crime scene processing for latent prints consists of using photography and powders. Latent print processing with powders involves the gentle application of powder to the slightly adhesive skin oils left on the surface of non-porous items.
- Apply powder with a brush dipped in fingerprint powder, or use a magnetic wand dipped in special magnetic powder. Generally, black will be the only powder color needed, even on black or dark colored items (the latent prints will actually be grayish in color when developed). **Please note that black fingerprint powder is generally easier to use than silver or fluorescent powders as these have a tendency to coat the surface area as well as the latent prints, making differentiation of the latent prints from the background more difficult.**
- Powdering and lifting latent prints takes practice, and it is recommended that training include a variety of shapes and surfaces likely to be encountered at a crime scene. Remember, once a print is destroyed, it cannot be reconstructed.
- After a print is developed on a non-porous surface, it should **first** be photographed if equipment is available, **including a scale in the picture** so that the print may later be restored to accurate size. Photograph the print at a 90 degree angle.
- To lift the developed print with fingerprint tape, smoothly place the tape onto the print and press to eliminate wrinkles and air bubbles which would interfere with the pattern. **DO NOT leave the tape on the item.** Carefully peel the tape off in one continuous motion, and smooth it onto a contrasting lift card surface.
- A thicker, more pliable fingerprint tape (polyethylene tape) is now on the market. This product allows the lifting of latent prints from curved surfaces without wrinkling.
- Supply the following information on all lifts:
 1. The name (or initials) of the individual making the lift;
 2. The date the lift was made;
 3. A case number or other identifying number; and
 4. An indication of where the lift was obtained.
- **Be sure to mark an "X" over any prints left on the tape by the lifting officer.**
- Porous or absorbent surfaces, such as paper and unfinished wood, ordinarily cannot be processed with powders, as skin oils soak in and are not left exposed to the powders. Chemical processing in the Laboratory and photography to preserve the image may make such prints visible for comparison. Due to the necessity for

photographing these reactions, and the danger of the chemicals involved, such processing must be done in a laboratory.

- **DO NOT** process or attempt to lift prints in blood. Allow bloody items or prints to air dry naturally. Do not dry with forced hot air (e.g., hair dryer).
- Only when a specific item of evidence cannot be submitted should an attempt be made to process a bloody print. Please call the Latent Evidence Section on a case-by-case basis.
- For wet items, the best results will be obtained in the Laboratory. Allow wet item to air dry naturally. **Do not dry with forced hot air** (e.g., hair dryer).
- In the event that you must process a wet item for latent prints, the Latent Evidence Section recommends the use of Small Particle Reagent (SPR).
- Various laser and light source instrumentation is available in the Crime Laboratory. The equipment has limited capabilities in field situations, and is best utilized in a controlled environment.
- In general terms, any item that experience indicates is a difficult surface for latent prints should be submitted to the Latent Evidence Section instead of attempting to process.

When submitting evidence to the Latent Evidence Section, please observe the following guidelines:

- Follow the Crime Laboratory's standard evidence submission procedures. **Check all packages for proper seals and sufficient labeling.**
- Wear surgical (or smooth surface) gloves and handle evidence "lightly." Do not write or place labels or tape on evidence to be processed for latent prints.
- Package evidence in a suitable container that will prevent any possible impressions from smudging or damage.
- Hand-carrying fragile evidence to the Laboratory is the best way to prevent damage.
- Do not package wet items. Air dry items naturally and then package them in paper bags or cardboard boxes.
- When submitting tape, package each strip or piece in separate containers (**preferably plastic bags or containers**) to prevent the loss or cross-contamination of trace material, and to prevent pieces from adhering to one another.
- The Latent Evidence Section will not accept controlled substances. Remove drug evidence from any container **PRIOR to it being** submitted for latent print analysis. Place such items in a non-evidence container and label carefully.
- The Latent Evidence Section will not work narcotics cases in which evidence was acquired through hand to hand buys by a sworn law enforcement officer or Possession of a Firearm by a Felon cases in which a sworn law enforcement officer removed the weapon from the subject. An exception may be granted if a request in writing is submitted from the elected District Attorney's Office.

- The method of analyzing an item of evidence is determined by the analyst assigned to each case. In the event that special circumstances exist which cause a specific type of analysis to be requested, please attach a letter of explanation.
- In latent print cases, provide both entire fingerprint and palm print impressions of the subjects involved. This is especially important in cases involving numerous latent prints. When fingerprinting an individual, collect complete and legible prints. Please note that prints suitable for classification purposes are not always of sufficient quality for latent print comparisons.
- Submit a subject's full name, race, sex, state identification number (SID), and date of birth. If inked impressions are not submitted with the evidence, the SBI Identification files will be checked.
- If it is necessary to have the FBI Identification files checked, please notify the examiner.
- Please note that there is no scientific method for determining the age of a latent print (i.e., how long the print has been on a particular surface).

NC State Automated Fingerprint Identification System (SAFIS) and FBI Integrated Automated Fingerprint Identification System (IAFIS)

The Latent Evidence Section provides local agencies with access to the NC State Automated Fingerprint Identification System (SAFIS) as well as the FBI's Integrated Automated Fingerprint Identification System (IAFIS). The SAFIS computer stores images of most of the ten-print fingerprint cards on file at the State Bureau of Investigation. The IAFIS computer stores most criminal fingerprint cards maintained by the Federal Bureau of Investigation. These criminal fingerprint cards may be transmitted to the Latent Evidence Section via the internet.

The SAFIS computer is able to search a latent fingerprint and a latent palm print from a crime scene against all criminal fingerprint cards stored in the system. If a fingerprint left at a crime scene is from an individual who has a prior criminal record, and fingerprints from that record are stored in the SAFIS, the latent print may be identified and the name of a potential subject provided. Latent prints that are searched by SAFIS with negative results will be retained in the Unsolved Latent File (ULF) and will be continually searched against all criminal fingerprint cards stored in the system.

The IAFIS allows for latent fingerprints to be searched nationally. If a person has a criminal record in another state, identification to that individual may be effected. Please note that the FBI's IAFIS currently cannot search palm prints and does not have an Unsolved Latent File (ULF). Neither the SAFIS nor IAFIS is able to search the joints, sides or tips of fingers, or footprints.

In addition, it may not be assumed that a crime was committed by an individual who does not have a prior record simply because the SAFIS and/or IAFIS do not identify the latent fingerprints submitted from a crime scene. Not all criminal fingerprint cards are loaded into the SAFIS and/or the IAFIS, and depending on the quality of the fingerprint card entered into the SAFIS and/or IAFIS, it may be impossible to match a particular individual's fingerprints with those left at a crime scene.

SAFIS Evidence Submission

- Submit latent prints for SAFIS/IAFIS searches with a completed Request for Examination of Physical Evidence form to the Evidence Control Unit.
- When completing the required submission form, provide all requested information concerning potential subject(s).

- The State Crime Laboratory requires the submission of elimination inked impressions in all simple, property type crimes. **Any case of this type which is submitted without elimination inked impressions will be evaluated and compared to any available known standards. A search will be conducted of the SAFIS, but will not be retained in the Unsolved Latent File (ULF) until elimination prints are submitted.** The submitting officer will be notified by report that elimination prints are needed.
- Any questions concerning the submission of SAFIS/IAFIS latent print searches should be directed to the Latent Evidence Section.
- Process arrest fingerprint cards through the SBI Criminal Information and Identification Section. Please note that arrest fingerprint cards are for recording purposes only. Arrest fingerprint cards are not treated as evidence, and no chain of custody is recorded while they are being processed.
- Do not submit routine arrest criminal fingerprint cards to the Crime Laboratory unless the intent is for them to be used as evidence.
- Do not submit latent fingerprint evidence to the SBI Criminal Information and Identification Section.
- Any questions concerning arrest fingerprint cards should be directed to the SBI Criminal Information and Identification Section.

Footwear and Tire Impressions

At many crime scenes, tire and footwear impressions are often difficult to locate. Observant crime scene officers will carefully seek out this evidence at all crime scenes. Proper protection of the crime scene will reduce the chances of additional impressions being made by emergency and investigating personnel.

- Entrance and exit areas are often fruitful areas to check for footwear and tire impressions.
- Sometimes doors are kicked and items inadvertently stepped on, and such possibilities should be considered during crime scene processing.
- When footwear impressions are located on hard surfaces, occasionally they may be enhanced by fingerprint powder. If done improperly, this process may be detrimental to the impression, so great care should be taken when applying the powder if at all possible, seize the item in question and protect the impression. Transportation to the Laboratory is often justified in these cases so that evidence may be more elaborately processed and examined.
- Always photograph any visible impressions prior to processing.
- When photographing impressions, always:
 - 1) Use a scale and take the photograph perpendicular or at a 90 degree angle to the impression.
 - 2) Fill the viewfinder of the camera with the impression (i.e., get as close as possible).
 - 3) Submit negatives of film or a compact disc of digital images of impressions as evidence to the Latent Evidence Section.
- In instances of dust prints, the impressions may be lifted with special gelatin lifters. Photographs of these impressions are important, as the lifts sometimes lack adequate contrast. In all photographs, aim the camera perpendicular or at a 90 degree angle to the impression and provide a scale. Show the center of the impression

in the center of the frame to reduce distortion. Be sure the scale is not on or in the impression. Gel lifters should be protected from heat and not stored in a hot environment (i.e. trunk of a car, etc.)

- Each SBI District Office's Crime Scene Search Specialist is equipped with an electro-static dust print lifter, a proven method for collecting dust impressions from smooth surfaces. To request this assistance, contact the local SBI District Office. **Dust impressions should never be placed in a cardboard box unless the box was manufactured and marketed especially for dust print lifts. Place the dust print lift inside a manila folder and then put the manila folder inside an envelope.**
- Because plaster shrinks as it dries, the State Crime Laboratory recommends using dental stone to cast soil or soft material impressions.
- Casting soil or soft material impressions involves a process of mixing the dental stone, pouring the dental stone into the impression, and making the proper identifying markings. As in fingerprint processing, this technique may be perfected through practice and experimentation.
- First, photograph impressions in soil or soft material such as sand or mud, and then cast the impressions using dental stone. Place a scale in the photographs at the same level as the lowest part of the impression, taking care not to cover an area that may be useful for identification purposes.
- Do not attempt to clean casts. Doing so may interfere with the integrity or the case or the impression.
- In all instances, attempt to obtain comparison standards of tires or footwear. Submit both shoes or boots (right and left), and any tire that could have made the questioned tire impression. Mark all submitted tires as to location on the vehicle (i.e., "left rear").
- Package items of evidence immediately in separate containers to preserve the integrity of trace material.
- Elapsed time between when an impression is left at a crime scene and when shoes or tires are collected may impact the Laboratory's ability to conduct a comparison examination. Collect known shoes and tires as soon as possible, and include the elapsed time between the incident and evidence collection when submitting items to the Laboratory.
- Please do not make impressions of shoes, boots, or tires being submitted to the Laboratory. Such "known standard" impressions are better done in the Laboratory where care of such evidence may be assured, and trace material may be controlled. For best results, please submit the shoes or tires for which the comparison has been requested.
- Package footwear or tire impression evidence in a strong cardboard or wooden box. Cushion well with a suitable packing material. Dust impressions are the exception, as previously discussed.
- Due to the fragile nature of footwear and tire impression evidence, please hand-carry it to the Laboratory. If such evidence must be mailed, take extra care in packaging it.
- Contact the State Crime Laboratory if there are any questions. Latent Evidence Section analysts will respond to any questions or concerns about evidence collection and submission.

TRACE EVIDENCE SECTION

The Trace Evidence Section deals with a wide variety of evidence not examined by other Sections of the Laboratory. Most of this evidence is very small and is not immediately observable to the investigator at a crime scene. The goal of the Trace Evidence Section is to identify these materials and compare them to a suspected source.

Standards represent the source of suspected transferred materials, such as walls, carpets, bedding, soil, ground debris, and so on. Laboratory analysts need standards to determine what types of materials were available for transfer and to compare with any materials found on questioned items.

The Trace Evidence Section normally performs accelerant, gunshot residue, hair, fiber, paint, glass, metals, explosives, physical match, headlight filament, white powders and pepper spray examinations. Analysis of unusual evidence such as feathers, wood, and plant material may be arranged by contacting the Trace Evidence Section.

Since particles analyzed by the Trace Evidence Section tend to be of small size, great care must be exercised to preserve particles and not to transfer material between two items to be analyzed.

The following precautions should be taken in each case:

- Do not interview the victim(s) and suspect(s) in the same areas of the crime scene.
- Keep the crime scene clear of unnecessary personnel.
- The suspect should never be brought back to the crime scene.
- Officers who have had contact with the suspect should not be allowed to participate in the search of the crime scene.
- Clothing items from the victim and the suspect should not be allowed to rest on the same surface before packaging.
- Each item of evidence should be packaged separately and as soon as possible.

The following pages of this Guide discuss different types of trace evidence that may be found at a crime scene and the proper ways to collect and package the evidence. If there are any questions concerning the proper way to handle a specific type of trace evidence, please contact the Trace Evidence Section at (919) 662-4500.

Due to the wide variety of evidence analyzed in the Trace Evidence Section, this section of the Evidence Field Guide is arranged in the following order:

- [Hairs](#)
- [Fibers](#)
- [Paints](#)
- [Vehicle Parts](#)
- [Light Bulb Filaments](#)
- [Glass](#)
- [Physical Match](#)
- [Gunshot Residue](#)
- [Accelerants](#)
- [Pepper Spray](#)
- [Metals](#)
- [Explosives](#)
- [Suspicious White Powders](#)

HAIR EVIDENCE

Scope of Analysis - Hair Evidence

- Hair examinations are conducted by making microscopic comparisons of head and pubic hair collected from the victim and the suspect to questioned hairs from the scene.
- Hairs from other parts of the body (e.g., arm, chest, beard, or leg hairs) lack sufficient identifying features to be submitted for comparison.
- Please note that age and gender cannot be determined by hair analysis.
- If DNA testing performed on an item of evidence results in a “match” to the suspect, any un-worked evidence submitted to the Trace Evidence Section shall be returned without analysis.

Standards for Hair Analysis

- Collect hair standards by plucking and/or combing a total of **50 full length hairs** from the head and pubic area only. Because hair characteristics may vary over the head and pubic region, investigators must collect the hair standards from various areas of each region. For example, comb and/or pluck hairs from the front, top, back, and sides of the head. **Never** collect hairs from one spot only and never cut locks of hair. If the trauma of plucking appears too great, then the hairs may be cut just at the surface of the skin, one at a time. In sex offense cases (notably alleged rape), collect pubic hair combings before collecting a pubic hair standard. Place head hair and pubic hair samples in carefully labeled separate envelopes. Make sure that the seals are secure to preserve the integrity of the hair standards.
- Collect and submit known hair samples from both the suspect(s) and the victim(s) as soon as possible after the incident. Proper standards from all parties (suspect, victim, elimination) are required if a hair analysis is to be performed. If possible, determine if hair length or color has been dramatically altered between the dates of the incident and the collection of the standard.
- Since hairs often also undergo DNA analysis, a DNA standard (cheek scraping or blood sample) should also

be submitted.

- **Collection of Sexual Assault Kits:**

Frequently medical personnel will collect sexual assault kits, which include pubic hair combings and hair standards, for investigators. In the event medical personnel seem unfamiliar with evidence collection, advise them that there is an instruction sheet contained within the kit. Emphasize the necessity of collecting proper head and pubic hair standards.

It is not required that medical personnel collect standards, and it may be preferable for an officer to collect the required hair standards as well as the cheek scraping.

Collecting Hair Evidence

- *Tweezers:* Hairs found at the crime scene or otherwise related to an incident may be collected using clean tweezers and placed in envelopes. When using tweezers, be sure not to squeeze the tweezers so hard that the hair is crushed or damaged.
- *Taping:* The lab will only accept tapings collected using clear fingerprint tape. Do not use frosted fingerprint tape, gel fingerprint tape or latent gel adhesive lifts. Wrap the tape around your hand and pat the surface where hair evidence may be located. Then place the tape immediately into a clean zip-lock or cellophane bag with the sticky sides against the plastic and seal the bag. Do not wad the tape or fold the sticky sides of the tape together. Do not allow the tape to stick to paper or cardboard.
- *Vacuuming:* Vacuum sweepings are not examined on a routine basis by the Laboratory and will only be examined with the prior approval by the Forensic Scientist Manager of the Trace Evidence Section.

Packaging Hair Evidence

- Wrap or bag each item of evidence separately in paper or cardboard for transportation to the Laboratory to preserve the integrity of each item of evidence. Hairs are durable and may be easily transported without damage as long as they are not crushed (e.g., by being placed under a heavy object).

Bulky Items

- Due to the limited personnel resources in the State Crime Laboratory, agencies are requested to tape bulky items (for example: clothing, bedding, furniture) for hair examinations rather than submitting these bulky items to the Laboratory. Exceptions must be approved by the Forensic Scientist Manager of the Trace Evidence Section.
- After the bulk item is taped, the original item may still be submitted for DNA analysis. If hair analysis is desired, please submit the tapings.

DNA Analysis of Hair Evidence

- Many hair associations are evaluated for DNA analysis. Therefore, known hair standards **MUST** be submitted with the evidence, as well as a DNA standard (cheek scraping).
- Nuclear DNA analysis: If hairs of evidentiary value are found, and if a suitable root is present, then the root will be removed and transferred to the DNA unit of the Laboratory.

- Mitochondrial DNA analysis: If no suitable root exists, then the hair evidence will be sent to an FBI regional lab for mitochondrial DNA analysis.
- Because DNA analysis may be more conclusive than hair analysis, if DNA analysis on any evidence is being conducted in the Forensic Biology Section, no hair evidence will ordinarily be examined by the Trace Evidence Section.
- In rare instances in non-suspect cases, hair may be approved for a CODIS search. This must have prior approval by the Forensic Scientist Manager of the Forensic Biology Section.

FIBER EVIDENCE

Scope of Analysis - Fiber Evidence

- Fiber evidence may help criminal investigators establish a sequence of events, corroborate witness information, identify murder weapons, and establish leads in a case.
- Fiber evidence may be found at the scene of various types of crimes, such as murder, rape, burglary, arson, hit-and-run, drug trafficking, and even extortion.
- Fiber examiners perform several different types of examinations, to include:
 - Comparison of questioned fibers/yarns/fabrics to known standards;
 - Analysis and comparison of ropes, tapes, plastic bags;
 - Analysis and comparison of garment construction and manufacturing characteristics;
 - Analysis of fabric impressions;
 - Cut/Torn determinations.
- Fiber examinations are done by making microscopic and instrumental comparisons of questioned fibrous materials collected from the victim, suspect, or crime scene to known standards. There are many types of materials that fall under the umbrella of fiber examinations. These materials include:
 - Individual fibers or yarn fragments (from the point of entry, stuck to a weapon, under the flap of an envelope, on a vehicle involved in a hit-and-run, on a body, etc.)
 - Fabrics /Garments/Bedding/Upholstery
 - Carpet
 - Airbags
 - Tape (duct, electrical, packing, masking, etc.)
 - Ropes and Twines
 - Burned Fabric
 - Plastic Bags, tarps
 - Wigs/fake fur
- If DNA testing performed on an item of evidence results in a “match” to the suspect, any unworked evidence submitted to the Trace Evidence Section shall be returned without analysis.

Standards for Fiber Evidence

- Collect standards from all items that could have been involved in either a primary (direct contact) or secondary transfer (from an article contacted by both suspected and known items).

- Where a mutual transfer is suspected, treat both items as questioned.
- Whenever possible, submit the entire item. When this is not possible, collect a representative sample of as large a size as needed to show any variation in the item.
- Standards should be collected from larger items such as carpet or upholstery during the initial search of the crime scene. These items may not be available at a later date.

Collecting Fiber Evidence

- Obtain fiber evidence as soon as possible to ensure retention of the evidence and to preserve the integrity of the evidence. Consider fiber evidence a primary source of information, not a last resort.
- Yarns and larger fibers that may be easily seen may be collected using tweezers. The evidence should be placed into a container of suitable size and taped securely.
- Fibers may be collected from larger areas (e.g., car seats, furniture) using tape. Use clear fingerprint tape. Do not use frosted fingerprint tape, gel fingerprint tape or latent gel adhesive lifts.
- After collecting the fibers, place the tape immediately into a clean zip-lock or cellophane bag with the sticky side facing the bag and seal the bag.
- Do not wad the tape or fold the sticky sides of the tape together.
- Do not allow the tape to stick to paper or cardboard. Do not package tapings in paper bags or manila envelopes.
- Vacuum sweepings tend to collect an over abundance of evidence. Under special circumstances, vacuum sweepings may be submitted with prior approval of the Forensic Scientist Manager. Vacuum sweepings should be collected only after the collection of the loosely adhering fibers using tape.
- When collecting tapes, ropes, or cords, clearly identify cut ends. Protect knots; do not untie them.

Packaging Fiber Evidence

- Clothing and bedding should be placed in paper bags or cardboard boxes, taped securely, and then submitted to the Laboratory.
- Do not package loose fibers in plastic so as to avoid the static formed between the fibers and the bag. Use gel caps, metal tins, or envelopes.
- Make sure the packages are well sealed to preserve the integrity of the evidence.

PAINT EVIDENCE

Scope of Analysis - Paint Evidence

- Paint chips and smears may be transferred whenever a painted surface comes in contact with an object or a person. Hit-and-run and breaking-and-entering situations are the two most common criminal activities that are likely to involve paint transfers.
- Paint evidence is significant due to varying layer sequences, differences in chemical composition, and other physical characteristics.
- If DNA testing performed on an item of evidence results in a “match” to the suspect, any un-worked evidence submitted to the Trace Evidence Section shall be returned without analysis.

Standards for Paint Analysis

Automobiles

- Collect standards from the area immediately adjacent to the damaged area.
- Collect paint standards from each panel of the car that is damaged, since bumpers, hoods, doors, etc. may have different types of paint even though they are the same color.

Other Objects

- Painted windows and door frames often have many layers of old paint. Submit wood sections containing all the paint layers.
- Submit the entire known object, if possible. This allows the analyst to determine the most appropriate location for standard collection.

Collecting Paint Evidence

Automobiles:

- For a typical automobile collision, collect a minimum of four samples for submission: a standard from each vehicle involved and a questioned sample from the damaged area of each vehicle.
- When contact occurs between an automobile and a person, submit the individual's clothing and any other personal items which may have been involved.

Burglary Tools: Burglary tools, such as screwdrivers and crowbars, may retain paint traces. Whenever possible, submit the entire tool for analysis.

Smears: If possible, submit the entire object containing the smear (e.g., car bumper, mail box post). If this is not possible, carefully remove a portion of the object leaving the smear attached.

Technique for collecting paint (standards or if entire item cannot be submitted):

- Using a new razor blade (one for each sample), cut all the way to bare metal (or other substrate) to obtain whole paint chips. Sometimes cutting a wedge-shaped chip is easier. It should be noted that automobiles often

have at least four layers of paint, so it is important to be sure that all of the layers are collected.

- Never use tape to collect paint chips, smears, or standards.

Packaging Paint Evidence

- Submit clothing in paper bags.
- Provide the paint examiner with the following information: color, make, model of vehicle, and the location of damage on each vehicle. Include a brief summary of how the accident reportedly happened.
- Paper folds make the best container for paint chips. Paper envelopes are also acceptable if all four corners and the flap are properly tape sealed.
- Plastic bags should not be used for paint chips or smears so as to avoid paint developing a static electrical charge.
- Metal canisters may be used as containers for paint evidence, but they are not preferred because small paint chips may potentially become trapped in the tape used to seal the canister.

PDQ Database of Automotive Paint Systems

- The purpose of the database is to attempt to identify the vehicle involved in an unknown hit-and-run (Vehicle vs. Person).
- In this type of case, the only evidence that needs to be submitted is the clothing of the victim. No standards are required for this type of analysis, as the offending vehicle is unknown.
- The following information may be derived from a PDQ search: color, make, model, year range, plant of manufacture, partial VIN.

VEHICLE PARTS

Scope of Analysis - Vehicle Parts

- During collisions, pieces may break off the suspect vehicle and remain at the scene.
- The scene should be searched for broken automobile parts, such as turn-signal covers, chrome strips, large paint chips, metal parts, and/or decorative items. Any items found should be collected.

Analysis of Vehicle Parts

- The part may subsequently be physically matched to the suspect vehicle providing proof that the vehicle was at the scene of the accident.
- If there is no suspect vehicle, the make, model, and year of the vehicle from which the part originated may be able to be determined.
- If it is a painted part, paint analysis may be conducted for comparison to a suspect vehicle.

LIGHT BULB FILAMENT EXAMINATION

Scope of Analysis - Light Bulb Filaments

- Light bulbs are examined in an effort to determine if the lamp was “ON” or “OFF” at the time of a motor vehicle accident. Headlights, parking lights, brake lights, turn signal lights, and marker lights may be examined. These bulbs are usually from, but are not limited to, automobiles and motorcycles.
- The filament area of the bulb is the most significant part for Laboratory analysis, and even small pieces of the remaining filament may yield useful information.

Collection of Filaments

- Be careful to prevent further damage when removing bulbs from vehicles.
- When necessary to prevent damage to the bulb, the entire lamp assembly should be removed by cutting connecting wires.
- Collect all the bulbs from the impact area.

Packaging of Filaments

Take extra care to prevent damage to the filaments during packaging.

- Package each bulb or assembly separately.
- Styrofoam Cup
 - The remains of headlight bulbs should be removed and placed filament first into a Styrofoam cup.
 - Tape may then be placed over the back side of the bulb to attach the bulb to the cup.
- Padded Box
 - Smaller bulbs may be packaged in a small box that is padded with tissue paper.
 - The entire assembly may be placed in a padded container such as a box filled with tissue paper or bubble wrap.

Submission of Filaments

- All properly packaged items from the same case may be placed in a cardboard box with appropriate padding.
- To avoid the potential for damage during mail handling, it is suggested that properly packaged items be personally delivered to the Laboratory.

GLASS EVIDENCE

Scope of Analysis – Glass

- When a window is broken, glass fragments rebound away from both sides. Fragments may be found in the hair or clothing of the suspect or victim as well as embedded in the object used to break the window.
- The most common types of cases with glass evidence are hit-and-run and breaking-and-entering.
- *Hit-and-Run:* In these cases, glass may be found on the clothing of the victim, at the scene, and possibly on the clothing of the suspected driver.
- *Breaking-and-Entering:* In these cases, glass may be found on the suspect's clothing and sometimes on the object used to break the window.
- There are several types of analysis performed at the Laboratory, but not all pertain to all types of glass. Usually, glass analysis consists of visual examination, elemental analysis, and refractive index measurements.
- Due to the limited number of glass manufacturers, glass analysis cannot absolutely identify the source of the questioned glass to the exclusion of all others. This is because many companies that use glass in their products buy from the same manufacturer. The examiner may only conclude that the glass from the questioned source is or is not consistent with the glass from the known source. The only way to identify the source to the exclusion of all others is through a physical match. Also, there is no glass database for the examiner to use that will allow identification of what make/model of car or manufacturer the glass fragment originated from.
- If DNA testing performed on an item of evidence results in a “match” to the suspect, any un-worked evidence submitted to the Trace Evidence Section shall be returned without analysis.

Standards for Glass Analysis

- Always submit samples of all broken windows/windshields/objects.
- Properly label each sample as a standard and specify where it was collected.
- If more than one window is broken, collect and package each separately. Collect glass fragments still located in the window frame to ensure that the standard is from that window.
- If windshield glass is being collected, submit both glass layers and label both the outside and the inside layer.
- In scenarios (e.g., hit and run fatalities) in which searching objects/clothing for glass fragments is desired, a proper glass standard must be available. If not available, these cases will be analyzed on a case-by-case basis only with pre-approval (faxed request will not be considered pre-approval) of the Forensic Scientist Manager of the Trace Evidence Section (919-662-4500 ext. 3521) or the State Crime Laboratory Director (919-662-4500) or designee.

Collection of Glass Evidence

- The object used to break the window should be collected. DO NOT attempt to remove the glass fragments from the object.

- The clothing of the victim and/or suspect should be collected as soon as possible.
- Have the subject stand over a large piece of paper and carefully remove their clothing. Package all of the clothing along with the paper together in a paper bag or box.
- Glass fragments may also be found in the hair or skin of the subject and should be collected noting the location where recovered.
- Shoes may be collected but often do not produce pertinent evidence.
- If the headlight casing on the suspect vehicle appears to be made of glass, it may be possible to match glass from the headlight casing to glass fragments found at the scene (see the "Physical Match" section below for collection instructions). Collect the entire casing and package so as to prevent further breakage.
- Architectural windows may be reconstructed to determine direction of force and order of impact (see the "Physical Match" section below for collection instructions.)

Packaging of Glass Evidence

- Glass evidence must be packaged carefully and sealed to preserve the integrity of the evidence and avoid potential injury to those handling the packaging.
- The best packaging materials for glass are metal tins, boxes, or manila envelopes. Label the item with the location where it was found.
- Large Pieces:
 - Do not use envelopes for large pieces of glass. Wrap each large piece separately in cardboard and package tightly to prevent breakage.
 - If an entire window is being submitted, the best way to package it is in a flattened cardboard box with all the sides sealed.
 - Hand delivering the evidence is best.

Physical Match Analysis of Glass

- Some types of glass products fracture into fragments which may be physically matched together like a jig-saw puzzle. The examiner fits the pieces together by microscopically matching stress lines and breaks to identify the pieces as having been broken from a single pane, bottle, or headlight/taillight.
- Bottles and headlights/taillights:
 - Collect as many fragments as possible, as well as any possible sources of the glass.
 - If significant portions of a bottle or headlight/taillight may be found and fitted together, leads concerning the type and manufacturer may be developed.
- Architectural windows:

- It is best to collect the entire window with the frame. Mark on the frame which side of the window faced the inside/outside of the structure before removing it from the structure. Take care not to cause pieces to fall out while packaging.
- Collect and package the broken glass fragments from inside the structure separately from those outside the structure and submit them with the window frame.

Glass Fracture Analysis

- Glass fractures form unique patterns, and examination may result in information as to the direction of breaking force or order of impact.
- *Direction of force:* Penetration of glass panes by bullets or high-speed projectiles produces a cone pattern from which the direction may be determined. Mark undisturbed pieces in the window as to “inside” or “outside” and submit all available glass so that enough pieces may be fitted together to identify the radial cracks near the point of impact and the point of impact itself. The direction of breaking force cannot be determined from tempered glass or very small panes of glass. With laminated glass, such as windshields, submit the entire windshield if possible.
- *Order of impact:* This type of analysis is most common with windows that have been shot several times. If enough pieces are physically matched together, it is possible to tell which bullet impacted the window first. However, this cannot be done for tempered glass.

PHYSICAL MATCH EVIDENCE

Scope of Analysis - Physical Matches

- The physical matching of one piece of evidence to another may establish that two items were once joined as one.
- If an article is randomly separated into two or more pieces during the commission of a crime, a jigsaw fit of the edges may indicate that the pieces were once joined.
- If a jigsaw fit is not possible, the pieces will be examined to determine if there are any corresponding features on the pieces that may indicate that the pieces were once joined.

Collection and Packaging of Physical Match Evidence

- Collect the two (or more) pieces to be compared with great care to avoid further fracture.
- Do not attempt to physically match the pieces prior to submission to the Laboratory, as this process should be conducted only in the controlled environment of the Laboratory.
- Protect the pieces from damage in storage and in transport. For large or unusual items, call the Trace Evidence Section for instructions.

GUNSHOT RESIDUE EVIDENCE

Gunshot Residue Kit collected from the Hands

- When a firearm is discharged, three elements associated with gunshot residue - barium, antimony and lead - may deposit on the hand(s) of the person firing the gun. By measuring the concentrations and distributions of these elements on an individual's hands, as well as identifying characteristic gunshot residue particles that are present, the examiner attempts to determine if the subject could have fired a gun or been in close proximity to a firearm when it was discharged.
- The collection of gunshot residue from the hands requires the use of a Gunshot Residue Collection Kit that utilizes both adhesive lifts and cotton swabs (combination kit). Gunshot Residue Collection Kits that only contain cotton swabs will not be analyzed. Contact the Trace Evidence Section for a list of current vendors that offer Laboratory approved collection kits.
- When a gunshot residue hand kit and clothing are submitted from the same subject, the gunshot residue kit shall be examined first. If the kit reveals particles characteristic of gunshot residue, the clothing will not be examined.
- Clothing and Gunshot Residue Collection Kits collected from the victim of a gunshot wound will not be examined for gunshot residue.

Collection of Gunshot Residue Kits

- The collection of gunshot residue should be conducted in accordance with the instructions provided in each gunshot residue kit.
- It is strongly recommended that only individuals who have been properly instructed in GSR collection procedures conduct this test.
- When using the combination style kits, **first**, use the stubs with adhesive surfaces to collect residue for particle analysis.
- **Second**, utilize the cottons swabs moistened with 5 % nitric acid for bulk analysis. This second part of the GSR collection is only to be performed **after** sampling with the adhesive stubs. It should be noted that **TWO** swabs should be used on each area of the hand (Two swabs for the control, two swabs for the left back, two swabs for the left palm, two swabs for the right back, and two swabs for the right palm).
- To avoid delay, provide all of the information requested on the data sheet enclosed with the GSR kit. On the rare occasions when required information cannot be provided, please so indicate on the data sheet.
- Give special attention to the "Final Instructions" portion of the "Instructions for Collecting Gunshot Residue" form.
- NOTE: In control test firings, it has been shown that the concentration of gunshot residue significantly declines after approximately 4 hours. In view of these findings, the State Crime Laboratory will not analyze samples taken more than 4 hours after the shooting from live subjects conducting normal activity.

GSR from Clothing and Other Surfaces

- This analysis is designed to determine the presence of characteristic gunshot residue particles on items that were near a firearm when it was fired. For instruction on this type of evidence, contact the Laboratory prior to collection and submission.
- Clothing for muzzle-to-target distance determination (e.g., having bullet hole(s) and/or shotgun pellet patterns) goes to the Firearms Section for analysis. The Trace Evidence Section does not analyze clothing from the victim of a gunshot wound.

ACCELERANT EVIDENCE

Scope of Analysis - Accelerants

- In many illegal burnings and arsons, petroleum products and chemicals are used to start the fires and/or increase the burning rate and damage from the fires. A careful examination of the fire scene by trained investigators may uncover points of origin, ignition sources, and accelerants.
- Suspected accelerant samples must be collected and preserved in proper containers to prevent evaporation and deterioration of the samples. Laboratory analysis of these samples may identify the accelerant used.
- Site examination is particularly important in arson investigations since much of the evidence pertaining to possible cause is available only on-site.
- When liquid is removed from a container prior to submission and both the liquid and container are submitted for analysis, only one of the items will be examined if the presence of an accelerant is detected in the first item.

Standards for Accelerant Analysis

- Comparison samples of liquids should be collected and packaged separately from debris samples.
- Control debris samples should not be taken from the fire scene unless they are requested by the State Crime Laboratory.

Collection of Fire Debris Samples

- For most fires, request assistance from the Fire Marshal or SBI arson investigators.
- Guidelines to be used when collecting fire debris samples:
 - Photograph the entire fire scene before removing any items. Give particular attention to suspected areas of fire origin.
 - Search for unusual odors and burn patterns which may lead to the point of origin. Even if accelerant odors are not present, samples should be collected from these areas and submitted for accelerant analysis.
 - Collect samples that are approximately the same size or volume as the container. For metal paint cans, the sample collected should fill approximately three fourths of the can. The headspace that is left at the top of the can is needed for extraction purposes.
 - Do not place disposable gloves that were utilized in the collection of the evidence in the container with the collected sample.

Collection of Liquid Samples

- Liquid samples should be removed from large containers and put into smaller ones before submission to the Laboratory.
- Seal liquid samples in small glass or metal containers.
- Collect liquid samples from the top layer of the liquid, as the bottom layer of liquid is usually water.

Packaging of Fire Debris Samples

- Samples should be packaged in airtight containers to prevent evaporation.
- Clean cans (new lined paint cans), glass jars, and nylon bags are the most appropriate containers.

DO NOT use paper or plastic (zip lock) bags.

- Containers may leak if not properly sealed. Clean the rim groove before placing the lid on a can. Completely seal cans and jars, and tape or heat-seal nylon bags. If you smell the sample when squeezing the container, the seal is not airtight.
- Be careful when selecting the type of container for the evidence (e.g., sharp edges will easily puncture nylon bags).
- Make sure the outside of the evidence is cleaned. Fire debris remaining on the outside of a metal can cause the can to rust from the outside in and may affect the integrity of the evidence. Samples in rusted containers will not be analyzed.
- In samples where an accelerant odor is not detected, a DFLEX device, if available, may be added to the debris sample at the scene before sealing the container. This device adsorbs accelerants from the sample and reduces the chance of evaporation. **Follow the manufacturer's instructions when using DFLEX.**
- Suspicious containers found at the fire scene should be collected and if possible sealed with a lid or stopper. These containers should then be sealed in nylon bags.

Submission of Fire Debris Samples

- **Samples should be submitted promptly (ASAP) to prevent loss of accelerant.**
- When alcohols are suspected, this must be indicated on the "Request for Examination of Physical Evidence" form as additional testing is required.

PEPPER SPRAY EVIDENCE

Scope of Analysis - Pepper Spray

- Oleoresin Capsicum (pepper spray) canisters are routinely analyzed to determine the amount of pepper spray remaining in the canister and the functionality of the canister.
- Clothing may also be analyzed for the presence of pepper spray.

Submission of Pepper Spray Evidence

- Submit all of the canisters used in the incident under investigation.
- Submit a minimum of one **unused** canister of the same brand, size, and type with the same label as the questioned canister (usually taken from another officer). This is required for comparison. If another canister is not available, please contact the analyst ahead of time. Submission of an unused canister is mandatory if clothing analysis is requested.
- Submit any product information sheets or pamphlets available that describe the type of pepper spray being submitted.

METAL EVIDENCE

Scope of Analysis - Metals

- Metals may leave chips, filings, or smears when they come in contact with other hard surfaces such as tools.
- Tool marks occur readily on most metals and may provide evidence of tool-to-metal contact. Please contact the Crime Laboratory's Firearm and Tool Mark Section for tool mark analysis requests.

Analysis

- Physical matches may be attempted with larger fragments.
- Smaller metal samples may be analyzed to determine the base metals and impurities or alloys that make up the particles.

Submission of Metal Evidence

- When submitting metal particles for elemental analysis and comparison, the suspected source should be submitted along with the questioned metal particles.

EXPLOSIVES EVIDENCE

Scope of Analysis – Explosives

- Site examination is particularly important in explosives investigations since much of the evidence pertaining to possible cause is available only on-site.
- In the event of bomb threats or to recover undetonated explosives, including homemade explosives, propellants, or high explosives, **request assistance from the SBI Hazardous Devices Unit (1-800-334-3000).**

Categories of Explosions

Diffuse Explosions

- Ordinarily of an accidental nature.
- Includes explosions of gas mixtures, dusts.
- Mixing illuminating gas or the fumes of gasoline, ether, benzene, or other inflammable gas or vapor with air in proper proportions creates a highly explosive environment that may be ignited by a pilot light, match, spark, or any other local high temperature.
- Only occur when the composition of the gas mixture is within the explosive range.
- An unduly high concentration of either of the component gases as compared with the other, however, will not be likely to provoke an explosion.
- Dust explosions are very similar in nature to explosions of gases and vapors.
- Occur over a relatively wide area.
- Diffuse explosions generally result in erratic damage, blowing objects in random directions rather than in a definite and simple pattern.
- Diffuse explosions tend to blow exterior walls outward, crumple interior walls and deposit fragments in several directions.
- Diffuse explosions generally do not provoke local shattering and do not create a crater or area of special damage or discoloration.

Concentrated Explosions

- Includes explosion of ordinary explosives such as black powder, dynamite, and nitroglycerine which themselves constitute a complete explosive system.
- Concentrated explosions generally result in a violent rearrangement of elementary constituents and produce large volumes of gas which is heated and expanded by the heat of the reaction.
- Originate at a point.
- All forces radiate from the point in three dimensions. Studying the pattern of an explosion may thus be important in determining the nature of the explosive material.

Collection of Post Blast Evidence

- **Exercise care in moving about the site because secondary hazards (i.e., exposed electrical lines, ruptured gas lines, improvised explosive devices [IEDs] etc.) may be present.**
- Origin determination
 - If a diffuse explosion is suspected, attempt to determine its origin.
 - If the use of an IED or explosive ordinance is suspected, attempt to locate the seat of the blast (point of detonation). This is usually determined by characteristic cratering or areas exhibiting the most extreme physical damage.
- Photograph and/or sketch the overall site and the presumed point of origin/seat of the blast.
- Search carefully for the remains of fuses, wires, batteries, containers (e.g., pipes, bottles), and possible timing or triggering devices.
- Collect samples of the debris which has apparently been blown away from the presumed point of origin/seat of the blast and fragmented into small pieces. Metal, wood, and glass are the best materials for examination.
 - Collected samples should be packaged in airtight containers to preserve the integrity of the evidence.
 - Clean cans (new lined paint cans), glass jars, and nylon bags are the best containers.
- Provide photographs and a crime scene sketch along with the items submitted for analysis.

Collection of Pre-Blast Evidence

- When bulk explosives, military ordinance, or IEDs that have been rendered safe are recovered, the Trace Evidence Section of the State Crime Laboratory should be contacted prior to submission.

SUSPICIOUS WHITE POWDER EVIDENCE

Collection of White Powders

- Exercise care in the collection of suspicious white powders. The number one goal in the collection of this evidence is to contain and reduce accidental exposure to the substance.
- Utilize personal protective equipment to avoid exposure.
- Coordinate with the local health department or Public Health Regional Surveillance Team to determine if there is a credible biohazard threat. **If the suspicious white powder is thought to be biological in nature, contact the FBI Charlotte Field Office at (704) 672-6100 or the NC SBI at (919) 662-4500 to initiate the HAZ-MAT response.**

Packaging of White Powders

- All suspicious white powders should be packaged in “generalized triple packaging” as specified by the CDC for shipment of biological agents. This packaging consists of an inner sample biohazard bag or glass vial, an inner leak proof poly bag, and an outer Tyvek envelope.
- **DO NOT USE PAINT CANS.**

Submission of White Powders

- The suspicious powder must be submitted to the N.C. State Lab of Public Health first to ensure that it is not biological in nature. **Contact the Bioterrorism and Emerging Pathogens Unit at (919) 807-8765 (Main Number) or (919) 807-8600 (24 hours a day).**
- Once the material has been analyzed by the Bioterrorism and Emerging Pathogens Unit and deemed to be non-biological in nature, the powder may then be submitted to the Trace Evidence Section of the State Crime Laboratory for identification. **The Public Health Department report showing the non-biological nature of the powder must be included with the Crime Laboratory submission paperwork.**

DIGITAL EVIDENCE SECTION

The Digital Evidence Section is responsible for the forensic examination of audio, video, and computer evidence. The Graphic Arts Unit is also a part of the Digital Evidence Section.

Digital Evidence Unit

Evidence is submitted for digital evidence examination in cases such as missing and exploited children, abduction cases, child pornography, homicide, financial crimes, terrorism, etc.

Types of Analysis Performed by the Digital Evidence Unit:

- Computer Forensics

Examination of computers and digital media

Examination of electronic storage devices (cell phones, digital cameras, etc.)

- Video analysis
- Audio analysis

Computer Forensics

Case Submission Criteria

Personal computers, cell phones, CDs and other removable media, digital cameras, tapes and other storage media found at crime scenes may contain vital evidence that may be examined, retrieved and saved by Laboratory forensic examiners. The Laboratory will accept computer forensic examination requests relating to the following incidents:

1. Crimes against children, e.g., child pornography, child abduction, sexual assaults against children, child molestation and traveling to meet a child for the purpose of sexual relations; **or**
2. Violent crimes, threats of violence or terrorism wherein a computer search may provide evidence of such crime (e.g., homicide, rape, or serious assault).

Collection of Computer Evidence

Caution should be used in the collection of computer evidence due to the volatile nature of this technology.

- If the computer to be seized is “off” at the time of discovery, **do not turn it on** or attempt to determine what evidence may be on it. Turning on the computer may alter the dates, times and files.
- If the computer is “on,” save any file or files that are open at the time the computer is seized to a separate diskette or USB storage device and pull the plug from the back of the CPU. Clearly mark and submit the diskette or USB storage device to the Laboratory at the same time as the computer.

Note: Investigators uncomfortable with computer operations or who do not understand their operation should seek assistance from the SBI Field Computer Crimes Unit or a knowledgeable crime scene specialist.

- Any relevant computer manuals or software located at the scene shall also be collected and may be submitted to the Laboratory as items of evidence at a later date if needed.
- At the time of the crime scene search, it is imperative to search, with proper legal authority, the area extensively for passwords. They may be jotted down on a desk blotter, a post-it note, or posted anywhere near the work station. Without them, data may be inaccessible.
- When seizing electronic devices such as cell phones and PDAs, look for and seize any power cords, changers, or cables to charge the batteries in these devices or to connect these devices to computers.
- For cell phones, if the cell phone is off at the time of seizure, leave the phone turned off. If the phone is on at the time of seizure, turn the phone off. If possible, remove the battery from the phone and submit with the phone.

Computer Forensic Submission Requirements

It is recommended that all computers be hand delivered to the State Crime Laboratory. Shipping computers to the Laboratory may unnecessarily subject them to rough handling, heat, or electric and magnetic fields which may compromise the integrity of information stored on the computer.

Complete the Supplement for Computer Forensics Requests. All computer forensic submissions **must** be accompanied by this portion of the form. Answer the questions in depth in order for the examiner to understand the request and provide an appropriate file search. Due to legal issues, it is **imperative** to state under what lawful authority the evidence was seized and to provide the Laboratory with a copy of this documentation, e.g., court order, search warrant, etc. Cases involving digital evidence, such as computers, should be packaged with anti-static bags or paper packaging. Due to static electricity, computer evidence should not be packaged in plastic. Be careful not to expose this type of evidence to magnetic fields. Magnetic fields are present in two-way radios, police equipment, scanners, speakers, stereo equipment, etc. If available, the computer should be packaged in the original box (from the scene) or equivalent. Anti-static foam padding or crumpled paper (such as newspaper) may be used to prevent shifting during transport.

Computer media should be packaged separately in evidence envelopes or bags and identified with sequential item numbers that represent an accurate inventory of the items being submitted.

Example (Request for Examination of Physical Evidence form):

- Item #1: Box containing one Digital PC 5000 computer processing unit.
Item #2: Paper bag containing five (5) floppy disks and one (1) CD-Rom.
Item #3: Paper bag containing one Nokia cellular phone.

Be aware items of evidence that have volatile memory or are battery operated, e.g., PDAs will lose all data if batteries are allowed to discharge completely; therefore, devices with removable batteries (AA, AAA) should be submitted with new batteries installed and the device should always be turned **OFF**. The new batteries must be inserted immediately upon removal of the old batteries. PDAs with rechargeable batteries should be recharged using the type of charger provided with the device. Upon submission of this type of evidence to the Laboratory, advise the receiving Evidence Technician that the evidence has volatile memory and the date the batteries were replaced or recharged.

As with all evidence accepted by the Laboratory, containers must be adequately sealed and initialed by the person sealing the packages.

In most cases, computer evidence will not be returned to the submitting department by mail or commercial carrier. Due to limited storage facilities at the Laboratory, the cooperation of submitting agencies is requested so that computer evidence is picked up as soon as the agency is notified that the evidence is ready to be returned.

Items acceptable for submission include:

- Laptop computers/PDAs
- Desktop Computers
- Digital cameras (including storage media)
- Cellular telephones/Smartphones
- Media (disks, floppies, etc.) regardless of what they are labeled
- Any passwords, user ID's, or screen names found at the scene shall be submitted.

Please Do NOT Submit:

- Computer displays/monitors
- Keyboard, mouse, or other accessories
- Printers, Speakers

Video Analysis

Video tapes from surveillance cameras may be enhanced to improve the quality of the images, or to slow down time lapse surveillance video and produce a video that may be viewed at a normal speed.

Images on videos may be captured and converted to still photographs.

When submitting video evidence, carefully package it to prevent damage during shipment. On the evidence submission form, indicate in some manner the area of interest on the video. This may be indicated by listing the time in hours, minutes and seconds, or by giving a description of a person of interest.

Analog Video

When locating the area of interest, avoid pausing or overplaying analog video. Excessive playing and pausing of the analog video (i.e., VHS videotapes) may cause serious degradation of the video quality. For analog tapes, the write-protection tabs should also be removed before viewing the video in order to prevent accidental erasure of the evidence.

Digital Video

For cases involving digital video (video recovered from a DVR system), the original video files as they are stored on the system should be recovered from the DVR system to get the best quality video. To get the best results possible, be sure that when exporting the video from the DVR system for analysis, the video is exported with NO compression. Many DVR systems store video in a proprietary format. When exporting video from the DVR, download the proprietary video player with the video if at all possible. Write protect media containing the exported video and video player if possible.

Return of Video Evidence

In a standard video examination, the results will be returned as a CD containing the still images of interest and a VHS videotape documenting the steps used in the analysis. Please note on the Request for Examination of Physical Evidence form if the results are desired in an additional format (e.g., DVD-video, uncompressed QuickTime files).

NOTE: Success in video enhancement is largely dependent on the quality of the surveillance video, camera placement and the lighting of the surrounding area. Video that is captured out of focus or in shadows will limit the amount of enhancement available.

Audio Analysis

Audio tapes may be enhanced to improve the clarity of the recording. Unwanted interference and noise may be filtered out. When submitting audio evidence, carefully package it to prevent damage during shipment.

Graphic Arts Unit

The Graphic Arts Unit provides support to SBI Agents, Administration, all law enforcement agencies, other state agencies and district attorneys throughout North Carolina.

Types of Services Performed by the Graphic Arts Unit:

- Crime scene reconstruction sketches (2D & 3D)
- Courtroom exhibits
- Diagrams, Charts, Time lines
- On-site crime scene reconstruction
- Crime Zone Software Training
- Suspect Target Boards
- Photo Line-Ups
- Wanted / Missing Persons Posters
- Special projects

Submission requirements:

Work orders should be accompanied by a **Graphics Unit Work Order Request**. Work requests for diagrams should include **measurements**.

FORENSIC BIOLOGY SECTION

Services

Deoxyribonucleic Acid (DNA) is a chemical that contains the genetic material for all living organisms. DNA is useful in forensic investigations because it is unique to each person (except identical twins) and may be used for identification or exclusionary purposes. The Forensic Biology Section assists in the investigation of a wide range of cases including homicide, rape, kidnapping, breaking-and-entering and assault cases. Services provided from this Section include identification of body fluids (blood, semen or saliva) and DNA typing tests.

Y-STR Testing

The Section does not perform Y-STR testing.

Mitochondrial testing

The Section does not perform mitochondrial testing. If this type of testing is needed, contact the FBI for submission to one of its regional laboratories.

Paternity testing

The Section does not perform paternity testing.

Fingernail Evidence

The Forensic Biology Section often gets requests to obtain DNA profiles from fingernail scrapings. The person collecting this type of evidence should look for loose tissue under the fingernail. If a clump of tissue is found, the tissue may be collected with a sharp pair of unused or sterile tweezers. Place this material in a paper fold. Then place this into a sealed container and label it appropriately.

Fingernail scrapings or clippings may be collected, but are not normally analyzed by this laboratory. Upon prior written approval of the Forensic Biology Section Forensic Scientist Manager, scrapings or clippings may be analyzed.

Fecal Material

The Laboratory has no test to identify fecal material; however, DNA analysis will be performed on submitted swabbings from the outer layer of the fecal material only. Do not collect a swabbing if the fecal material is in water or non-formed. Allow the swabbing to air dry thoroughly before submitting.

Vaginal Secretions, Urine and Sweat

The Laboratory has no test to identify vaginal secretions, urine or sweat.

Drug Cases, Fingerprint cards and Submerged Items

DNA analysis will be performed in drug cases, on fingerprint cards and on submerged items upon prior written approval of the Forensic Biology Section Forensic Scientist Manager.

“Touch” DNA Samples

The Section performs analysis on “touch” DNA cases. Touch DNA is defined as evidence that has no identifiable body fluid and could contain DNA only as a result of touching an item with the skin. Touch DNA typically includes the swabbing of surfaces. Touch DNA samples must have the appropriate standards submitted including all elimination standards. Since it is not possible to collect all standards from business property crimes, the Section cannot accept these types of cases.

In general, for items to be processed for “touch” DNA, no more than 2 swabs should be taken from the item. Best practice is to use one wet (sterile water) swab followed by one dry swab. Both swabs should be packaged together.

Touch evidence does not include cigarette butts, swabbings from cans, bottles, straws or other items in which the substance being tested is most likely saliva or items submitted from the wearer such as shirts, shoes, hats, etc. where there is probability of prolonged contact.

For firearms, if the item itself cannot be submitted to the laboratory for DNA processing, the 2 swab suggestion still applies. Rough surfaces on weapons (such as grips, slide, trigger, hammer) generally provide the best chance for DNA recovery. This also preserves smooth areas for potential latent print development. If a magazine is associated with a firearm and “touch” DNA is requested, it is recommended that only the rough surfaces (*e.g.*, bottom of the magazine) be swabbed (2 swab suggestion). This will also help to preserve any potential latent prints on the smooth portions of the magazine. Swabbing(s) of the magazine can be included as part of the overall swabs collected from the firearm (*i.e.*, they can be combined). This is especially recommended if the magazine is found inside the firearm at the time of collection. If the firearm contains ammunition, live rounds/casings should NOT have separate swabs made: all rounds should be swabbed together (2 swabs total).

Touch DNA Testing will be performed only on the following:

- Weapons used in the commission of a crime (knives, guns, pipes, bats, etc.).
- Clothing only with prior written approval of the Forensic Biology Section Forensic Scientist Manager. (This limitation does not include the examination for the wearer of the article of clothing.)

Touch DNA will **not** be performed on the following:

- Evidence related to weapons violations (*e.g.*, possession of a firearm by a convicted felon).
- Ammunition, shell cases or swabbings from ammunition/shell cases not located in a firearm.

Collection, packaging and storage of Evidence

Avoid directly touching the evidence with bare hands or introducing body fluids that contain DNA to the evidence. Saliva and mucous produced by coughs, sneezing, or even talking over the evidence may introduce enough DNA to affect the evidence.

Avoid excessive heat, humidity, temperature fluctuations and damp conditions by maintaining evidence under environmentally controlled conditions such as an air conditioned/heated building or room. If transporting the evidence, place the evidence in a climate controlled portion of the vehicle if possible (*e.g.*, do not transport in the trunk).

Always allow DNA evidence that is wet or that contains liquid body fluids to dry naturally before storing. Store evidence in breathable containers (*e.g.*, paper or Tyvek envelopes, cardboard boxes, but NOT in plastic) to avoid condensation.

Package each item intended as a separate piece of evidence separately (*i.e.*, victim’s clothing in one container, suspect’s clothing in a second container, etc.).

Always package evidence in paper. Never use plastic bags or plastic containers.

Pad fragile and sharp articles so that they will not break or penetrate the packaging.

Store evidence in a cool and dry location.

Clothing

If clothing is wet, lay the clothes out flat until dry; do not fold while wet. Submit the entire article of clothing. If the clothes must be cut off, never cut through existing holes such as knife or gunshot holes.

Wet Stains

If the entire item may be collected, do so. Air dry the item thoroughly before packaging it in a paper container. Do not apply heat to dry an item. If a wet stain is present and the whole item cannot be seized, the stain should be removed using a clean sterile cotton swab. Swab the stain until the stain is no longer visible or until the swab becomes saturated with stain. If possible, collect at least two swabs. Collect the stain on the very tip of the swab until the swab tip is dark in color.

Dry Stains

The best choice is to collect the entire article; however, there may be times when this is not practical. If a stain must be cut out of an article such as carpet, cut the ENTIRE stain. If multiple areas are being cut out of an article, clean the cutting instrument before going to the next area to preserve the integrity of the cutting. If an article cannot be removed entirely or cannot be cut, the sample may be absorbed onto sterile swabs. Place a drop of sterile water on the swab and shake the swab to remove excess water. Swab the stain on the very tip of the swab until the swab tip is dark in color or the stain is no longer. If possible, collect at least two swabs. If the sample is very small, be very careful not to dilute the sample.

Sexual Assault Cases

- Take the victim to the hospital as soon as possible to have a Sexual Assault Kit collected. Advise the victim not to clean up prior to going to the hospital so as to preserve potential evidence. The panties that will be collected in the Sexual Assault Kit are those that are worn after the attack. The pair removed before the assault is not where the potential forensic evidence may be found.
- If a suspect is identified, a DNA sample may only be collected pursuant to lawful authority such as consent, a non-testimonial identification order (pursuant to N.C.G.S. § 15A-271), or a search warrant for adult offenders. For juvenile offenders, a sample may be collected pursuant to a non-testimonial identification order N.C.G.S. § 7B-2105(b). The SBI Subject Collection Kit should be used to collect this sample. Collect samples according to the instructions packaged within the kit. Contact the Forensic Biology Section for a list of current vendors that offer Laboratory approved collection kits.
- Additional articles, potentially bearing body fluids and hairs, may be collected by law enforcement. Remember that the hair must be removed from these articles if hair analysis is requested in the case. Do not submit the suspect's clothing for semen analysis. However, if the victim is bleeding, the suspect's clothes may be analyzed for the victim's blood.

Cigarette Butts

Using tweezers or gloves, pick the butts out of the ashes and place in an envelope (multiple butts in an ash tray should be placed in the same envelope). If the victim or suspect is a smoker, determine his/her brand preference, if possible, and indicate it on the envelope or submission sheet.

Standards

Known blood standards or cheek scrapings should be collected from all individuals relevant to the case. A proper blood standard consists of ONE lavender (EDTA) stopper blood tube OR a dried blood stain. A proper cheek scraping consists of 2 sterile swabs rubbed vigorously on the inside of an individual's cheeks. If an individual did not bleed, but his/her clothes are being sent in for comparison purposes, his/her DNA standard should also be sent for elimination purposes as his/her DNA may be present from saliva or skin cells.

Liquid blood samples should be kept under refrigeration prior to submission to the lab. Never freeze liquid blood samples.

Submit the dried bloodstain prepared by the medical examiner from the autopsy.

Alternate Standards

If no blood sample is available due to complete exsanguination (loss of blood), or if an individual has been transfused within two weeks, an alternate standard may be obtained which may include:

- If the individual has been transfused but is still alive, collect a buccal swab (cheek scraping) standard.
- An article of clothing (with chain of custody intact) that is stained with what must be considered to be the subject's blood.
- If the corpse has bled out or is decomposing, ask the pathologist for 2-4 teeth (preferably molars without dental work). If they are not available, request a 3-6 inch section of compact bone (femur). Bone material that is still attached to tissue must be frozen prior to submission to the lab and must be hand delivered. Please note that human tissue or bones cannot be destroyed or disposed of without a court order. This is the responsibility of the submitting agency.

Case Acceptance/Submission

Please submit only evidence that is relevant to the case (i.e., evidence most likely to be of probative value). The purpose of testing is to examine whether there has been a transfer of body fluids (DNA) between the victim and suspect and/or crime scene. An example of non-probative evidence might include looking for the victim's blood on his/her own clothing or the suspect's semen on his own clothing. DNA will only be performed on cases where the identity of the assailant is in question.

The following guidelines shall apply:

- No analysis will be performed on items retrieved from a person or a person's property when the intent is to link that person to the item.
- Except upon prior written approval of the Forensic Biology Section Forensic Scientist Manager, no analysis will be performed in sexual assault cases where the suspect has admitted having sex with the victim and the victim is 16 years or older.
- Section analysts will perform body fluid (blood, semen, saliva) and DNA testing, if necessary, on evidence if all standards are submitted (including elimination), or if the suspect is identified in CODIS but there is insufficient probable cause to obtain a standard.
- In felony cases where a body fluid is present (blood, semen, saliva) and there is no suspect identified, Section analysts will perform body fluid and DNA testing.
- A confirmatory test for human blood (i.e., to determine if the origin is human) will only be done at the written request of the elected District Attorney's Office.

The depth and scope of examinations selected by the analyst for a given case may be dependent upon the amount of information provided by the submitting officer. It is imperative, therefore, to include a complete description of the alleged incident on the second part (Part B) of the Request for Examination of Physical Evidence form or to attach a copy of the investigative report. In addition, a preliminary discussion between the submitting officer and the analyst may also be of assistance.

Analysts need to know, for example:

- How many people could have bled.
- Victim's and suspect's statement.
- What, if any, unusual circumstances may have affected the stains, such as soaking, heating or contamination.

Complete information is also essential in making determinations in sexual assault cases as to the donor of any semen detected. Since these cases deal with a mixture of body fluids from at least two individuals, the analyst **MUST** know if the victim had sexual intercourse with any other individuals in the 72 hours prior to the assault. If so, an elimination standard from such individual(s) must be submitted.

Other important information includes:

- 1) Did the alleged assailant ejaculate;
- 2) Did he wear a condom;
- 3) What body cavities did the assailant allegedly penetrate;
- 4) If oral sex was allegedly involved, state by whom and on whom;
- 5) Was ejaculation reported to have taken place outside the body, and if so, where was the semen reportedly deposited;
- 6) Does the suspect deny having sex with the victim?

Many of these questions must be answered before analysis may be completed.

The State Crime Laboratory does not conduct **paternity** testing even if criminal charges are pending (i.e., the child was conceived as the result of a rape). By extension, the Laboratory does not perform reverse paternity testing which would occur when one is asked to determine if a body or sample could be the result of a set of biological parents.

All cases, with or without suspect standards, will be routinely examined through Body Fluid identification. All cases with suspect standards will be routinely examined through DNA analysis. All no suspect crimes, (except certain property crimes described below) will be accepted for DNA analysis as long as all elimination standards are submitted. In order for a no-suspect property crime to be accepted for DNA Analysis, it must be a felony or serial in nature.

CODIS REQUIREMENTS

Only items of evidence directly attributable to a suspect may be uploaded to the national level of CODIS. If information cannot be provided that reasonably links a particular item to a crime the resulting profile will not be placed into the CODIS database.

Safety Considerations for Biological Evidence

Always assume that unknown samples may be a biohazard and handle the evidence accordingly. Always follow universal precautions. Use clean gloves; do not smoke, drink or eat until after removing the gloves and washing hands; do not agitate the stain and avoid flaking off fine particles that float in the air.

If at all possible, evidence should not be directly handled in court. If the evidence can be viewed through a plastic bag or container, it should not be removed. If the evidence must be removed from its container, it should be handled with gloves. Gloves should be changed between the handling of each piece of evidence.

On occasion, swabs or DNA extraction tubes are removed from their containers for illustrative purposes. The importance of viewing these items may be outweighed by the risk of exposure to extraneous DNA. For this reason, these items should not be removed from their containers and should remain in a sealed condition if at all possible.

Post-Trial Storage of DNA Evidence

As a chemical, DNA is relatively stable. However, certain environmental factors may break down DNA into smaller pieces. When storing evidence that might contain DNA (DNA evidence), the environmental factors may be negated by maintaining the evidence in a dried state and preventing direct exposure to light. If evidence containing DNA is packaged correctly and stored under proper conditions, it will be stable and therefore useful for forensic examination indefinitely. Researchers have reported isolating DNA from ancient Egyptian mummies and from prehistoric insects preserved in fossilized Amber. The State Crime Laboratory has successfully examined forensic cases where the DNA evidence was stored in excess of 20 years.

General Statute §15A-268 states “a custodial agency shall preserve any physical evidence, regardless of date of collection, that is reasonably likely to contain any biological evidence collected in the course of a criminal investigation or prosecution. Evidence shall be preserved in a manner reasonably calculated to prevent contamination or degradation of any biological evidence that might be present, subject to a continuous chain of custody, and securely retained with sufficient official documentation to locate the evidence.” For the required length of time of storage of such evidence, refer to N. C. General Statute §15A-268. In accordance with this statute and 143B-601, the Department of Public Safety has created a long term storage facility to alleviate the shortage of storage space in law enforcement evidence retention areas. For information regarding this facility, contact the Department of Public Safety.

- For long term storage, DNA evidence that contains tissue, bone, teeth, hair roots, etc should be frozen in a NON-Frost free freezer if possible. The freeze thaw cycle may affect the DNA. All DNA evidence may be frozen, but do not use a Freezer that has a “defrost” cycle. Exhumed bone that is extremely old and dried as well as teeth may be stored at room temperature.
- Sexual Assault Evidence Collection Kits (SAECK) should be stored at room temperature. Any SAECK currently in a refrigerator should be placed in a climate controlled room. All items inside the kit are dried and more stable at room temperature. Refrigeration may cause deleterious condensation on evidence inside the SAECK.
- Liquid blood samples should be stored under refrigeration before submission to the State Crime Laboratory. Once the Laboratory has processed the liquid blood, the liquid blood may be stored at room temperature.

DNA Database

The State of North Carolina enacted General Statute §15A-266 on December 1, 1993. This statute required the DNA profiles of certain convicted felons to be analyzed and stored. In December of 2003, this statute was amended to include all convicted felons. General Statute §15A-266.3A, which became effective February 1, 2011, made two significant changes to the state's laws on DNA collection: (1) DNA samples will be collected from persons upon arrest for specified offenses, and (2) the general method of DNA sampling is changed from blood sample to cheek cell collection. Collection will be performed using the standardized DNA Database Collection Kit. DNA Database Kits are distributed by the DNA Database Unit upon request to all law enforcement agencies.

DNA Database samples should be submitted to the DNA Database Unit, either by U.S. Mail or by personal delivery. Sample Inventory Forms must be completed for all samples submitted from the North Carolina Department of Correction and sent with the corresponding samples to the State Crime Laboratory DNA Database Unit.

The DNA profiles obtained from convicted offenders and arrestees will be entered into a computer database known as CODIS (Combined DNA Index System).

As of June 2013, the State Crime Laboratory had over 248,000 genetic profiles in its DNA database. Although approximately 220,000 of these profiles are convicted offenders and approximately 10,000 of these profiles are arrestees, the State Crime Laboratory also maintains genetic profiles from suspects, forensic unknowns, missing persons and unidentified remains. The State Crime Laboratory DNA Database Unit is linked to other state and federal labs using CODIS (Combined DNA Index System) which combines forensic science and computer technology into an effective tool for solving crimes and eliminating suspects. CODIS enables state and local crime laboratories to exchange and compare DNA profiles electronically, thereby linking unsolved crimes to each other and to convicted offenders.

If a CODIS "hit" is obtained between an unsolved case and a North Carolina convicted offender or arrestee, State Crime Laboratory DNA database analysts will reanalyze the convicted offender or arrestee sample to ensure that the profile obtained is concordant with the profile in CODIS for the subject. A latent analyst will verify the identity of the finger prints on the DNA Database Collection Card submitted with the subject's DNA database sample. Also, for convicted offenders and arrestees, State Crime Laboratory personnel will determine the incarceration status of the subject on the date of offense in question and the current location of the subject.

Once all verification procedures have been completed, the law enforcement officer who submitted the case will be notified as to the identity of the convicted offender or arrestee. This information may only be used as probable cause to obtain a search warrant for a known DNA standard from the subject. If requested, State Crime Laboratory personnel (sworn agents) may assist in the writing and serving of the warrant for the DNA standard.

If an officer has a case in which he/she lacks sufficient probable cause to obtain a known DNA standard, he/she should determine if the State Crime Laboratory has the subject's DNA sample on file as a convicted offender or arrestee sample in the DNA Database. To verify if a subject's arrestee sample is on file, please call the DNA Database Unit at 919-662-4509 ext 2275. To verify if a subject's convicted offender sample is on file, the officer may use the Computerized Criminal History (CCH) files to check for the DNA flag that states "DNA available at the NC SBI Lab: YES or NO."

NOTE: If the DNA Flag is marked as "Yes" this only indicates that a convicted offender DNA sample has been collected from this individual. It DOES NOT indicate that the individual's genetic profile has been entered into the DNA database. If a subject has a convicted offender DNA sample on file within the DNA database it is not necessary to collect an additional arrestee sample for this individual. If the officer performing the collection has any questions concerning whether to collect an additional specimen, then the officer should contact the Forensic Biology Section at 919-662-4500.

If the officer wishes to submit evidence for comparison to a convicted offender or arrestee sample identified as being in the database, then the officer **MUST** contact the Forensic Biology Section at 919-662-4500 for permission to submit the case without a suspect standard. This option should **ONLY** be used for those cases where it is **IMPOSSIBLE** to get a known DNA sample from the suspect.

The standardized DNA Database collection kits are for offender/arrestee collection only and are not to be used in the collection and submission of victim or suspect standards.

FIREARM AND TOOL MARK SECTION

Capabilities and Service

- Determine whether a bullet, cartridge case, or shot shell was discharged from or in a particular firearm.
- Determine if a particular tool mark or tool impression was made by a specific tool.
- Determine if a broken part or piece of a tool or firearm was once a part of a particular tool or firearm.
- Determine if a gunpowder residue pattern or a shotgun pellet pattern is present on a given article (e.g., clothing, bed sheets, curtains), and, if present, the distance a specific firearm muzzle was from the article at the time of firing.

(NOTE: this can only be performed if suspect weapon and ammunition are available.)

- Identify bullets and/or cartridge cases as to type, caliber, and possible manufacturer. Provide listings of type, make, or caliber of firearms that may have fired a particular bullet.
- Determine shot size, wadding, gauge, and possible manufacturer.
- Perform serial number restorations on firearms.
- Determine if a firearm functions properly and trigger pull weight.
- Provide assistance at crime scenes pertaining to forensic firearm and/or tool mark examination.
- Provide seminars and classes related to forensic firearms and tool marks.
- Perform automated checks of cartridge case evidence from unsolved crimes against firearms and evidence from other crimes using the Integrated Ballistics Identification System (IBIS).

(NOTE: The IBIS BRASSTRAX™ System in operation at the North Carolina State Crime Laboratory Firearm and Tool Mark Section does not accept entry of fired bullets.)

- Maintain a firearms reference collection.
- Maintain an ammunition reference collection.

Type of Analyses or Examinations

Firearm or Ammunition Cases

Bullets, cartridge cases, and shotshells are compared to a suspected firearm in the following manner: analysts fire test cartridges of the same manufacture, caliber or gauge, and bullet type or shot size from the suspect firearm. The test bullet, cartridge case, or shotshell is next compared microscopically with the submitted evidence bullet, cartridge case, or shotshell.

Tool Mark Cases

In tool mark examinations, analysts microscopically compare test tool marks made with a suspect tool to submitted tool marks. Generally, tool marks fall into two categories: impressions or striations.

Because of the considerable length of time required to reproduce questioned tool marks with a particular tool, tool marks for comparison with a tool left at the scene of a crime cannot be accepted unless the suspect tool may be tied to a suspected perpetrator through investigation. Tool mark examinations will not be conducted for misdemeanor criminal offenses (Ex.: breaking and entering a vending machine).

Gunpowder Pattern Analysis

Gunpowder pattern analysis helps reconstruct aspects of a shooting, especially distance determination. Articles submitted for analysis are chemically treated with solutions capable of indicating the presence of nitrites from burnt gunpowder or lead particles and vapor. If a gunpowder pattern is located, the suspect firearm is test-fired at various distances using the evidence or similar type ammunition used in the crime. These test-firings produce standard test cloths. The gunpowder pattern on the test cloths that most resembles the pattern on the evidence provides an approximate muzzle-to-target distance at the time of firing.

Please note this testing can only be preformed if suspect weapon and ammunition are available and must be accompanied by a written request from the appropriate District Attorney, US Attorney, Judicial Official, or Federal/State Official and approved by the Forensic Scientist Manager of the Firearm and Tool Mark Section or Crime Laboratory Director. The final decision on whether to conduct such testing shall be that of the Laboratory Director.

Firearm Serial Number Restoration

Obliterated serial numbers prevent investigators from tracing firearms. The serial number may have been filed, punched, or even treated with acid. An examiner may restore an obliterated serial number through a number of physical and/or chemical processes. Once the serial number is restored, a weapon may be traced and a determination of whether it has been stolen may be made. For gun trace information, please contact the local Bureau of Alcohol, Tobacco, and Firearms (BATF) Office.

Integrated Ballistic Identification System

Integrated Ballistic Identification System (IBIS) is an automated computer system that captures the individual signatures of fired bullets and cartridge cases and stores them in a database. The system is designed to run correlations on these signatures to determine any possible matches. IBIS is part of the National Integrated Ballistic Information Network (NIBIN).

Please note that only cartridge cases may be entered into IBIS. The IBIS BRASSTRAX™ System in operation at the North Carolina State Crime Laboratory Firearm and Tool Mark Section does not accept entry of fired bullets.

Evidence Submission

Firearms evidence should be submitted to either the State Crime Laboratory in Raleigh or to the Western Regional Laboratory depending upon the location of the submitting agency. **Please refer to Page 11 of this manual for a list of counties that are served by the Firearms Section in the Western Lab.**

Proper collection, marking and handling of firearm and tool mark evidence makes the examiner's work easier and ensures a more complete examination. Please observe the following general guidelines for proper collection, working,

and handling of firearm and tool mark evidence.

Firearms:

- Never place anything into the barrel of a suspect firearm.
- If the submitting officer deems it necessary to have the firearm processed for latent prints, handle the firearm only by those areas that normally do not yield fingerprints (e.g., checkered grips, edges of the trigger guard, or any knurled area).
- If possible, carefully unload the firearm at the scene. On revolvers, it is a good idea to note which chamber was under the hammer and/or the location of discharged and live cartridges in relation to that chamber. On pistols and other firearms that load by magazine, remove the magazine and unload the live cartridges from the magazine.
- Use care in marking firearms. Usually the side plate of revolvers and the slide area of automatics are the best locations for identifying marks. Be careful not to destroy any trace evidence when marking a firearm. If the firearm is to be examined for latent prints, do not mark the weapon - place all necessary information on a tag and attach the tag to the weapon. The submitting officer should record all available information about the submitted firearm in his/her notes (e.g., the serial number, make, and model).
- Collect firearms separately in a paper or plastic bag. Do not use plastic bags for firearms that are being submitted to the State Crime Laboratory's Latent Evidence Section, Trace Evidence Section, or Forensic Biology Section.
- Only submit loaded firearms when absolutely necessary - and then do so in person. Place loaded firearms in sturdy containers, not paper or plastic bags or envelopes, and tie them down to prevent movement. Mark the package - **Caution - Loaded Firearm**
- Submit firearms discovered in water **SUBMERGED** in a sample of that same water. Please use a water container that may remain with the firearm when submitted. Some examples of containers are screw-capped PVC pipe, old paint cans, and Tupperware-type containers.
- In circumstances where the firearm cannot be submitted, but test fires are available, contact the State Crime Laboratory Firearms Section for further instruction.

Bullets, Cartridge Cases, and Shotshells

- Collect all live ammunition at a crime scene for use as standards. **Only submit live ammunition of the same caliber as any firearms submitted. Contact the Firearm and Tool Mark Section if there are any questions.**
- Do not mark cartridge cases or bullets in any manner. Place them in individual envelopes and place all necessary identification data on the outside of these envelopes. This process prevents accidental marring of the important surfaces of the bullet and/or cartridge case and accidental destruction of trace evidence. All containers should be sealed and initialed.
- When collecting bullet, cartridge case, shotshell, and similar evidence at a crime scene, do not attempt to wash or clean the evidence.
- Do not place cotton or tissue around bullets, as this material may adhere to blood or other matter on the

surface of the bullet.

- At autopsies, it is requested that pathologists attempt to clean blood or other body fluids off the evidence prior to packaging.
- Do not allow fired bullets or shotshell wads to remain sealed with blood and/or other body fluids in an air tight container.

Gunpowder Examination Evidence

- AIR DRY clothing or other articles submitted for gunpowder pattern examinations.
- Mark each piece of evidence for identification using a tag and attach the tag away from any bullet holes, powder, or blood.
- Place each piece of evidence in separate, sealed PAPER bags. Never use plastic bags to store gunpowder examination evidence.
- Always wear protective latex gloves when handling bloody items. Handle articles carefully, avoiding shaking or brushing.
- Submit only the outermost garment(s) that have been shot. Underlying garments that are completely covered and/or garments that have not been shot should not be submitted.

Tool Mark Evidence

- Whenever possible, collect the item(s) containing the tool mark(s).
- In the case of extremely large or immovable items, either remove that section of the item containing the tool mark or make a cast of the tool mark using Mikrosil, silicone rubber, or other suitable casting material. **Submit any castings in paper or cardboard.**
- Package all tool mark evidence separately. Package the working end of a suspect tool to prevent damage to the working surface and to preserve the integrity of the item. Do not use tape to cover or protect the end.
- Never touch or fit a suspected tool to a tool mark.
- Never clean a tool or a cast of a tool mark. Submit the evidence, as is, to the Laboratory.
- Never attempt to make test marks with a suspect tool.
- Mark all containers for identification and be certain they are properly sealed.

Test cartridge cases and evidence cartridge cases for entry into IBIS ONLY

- If dealing with **evidence**, determine if there is a need for other Laboratory analysis to be performed. If so, use the Request for Examination of Physical Evidence form and follow the submission instructions outlined on that form. It is important to note ALL analysis and testing requested because firearm testing may preclude other analysis, such as DNA testing or digital evidence analysis, if performed before such analysis.

NOTE: During routine casework, all fired evidence cartridge cases and all test fired cartridge cases from evidence

firearms that meet the IBIS requirements are entered into IBIS.

- If the **evidence** is being submitted for entry into the IBIS database **only**, indicate in the space “Examine for IBIS only.” Please indicate the actual alleged offense in the “Type of Case” space on the Request for Examination of Physical Evidence form.
- Use one Request for Examination of Physical Evidence form for each case to be submitted.
- When submitting **test** fired cartridge cases for entry into IBIS only, use the IBIS Submission form.
- It is mandatory that the Case #, Incident/Recover Date, and the Description/Remarks sections be completed for each firearm test fired.
- Multiple case submissions of test fires may be made on the IBIS Submission form.
- Only centerfire caliber handguns and caliber 7.62 x 39mm and .223 (5.56mm) rifles should be submitted for entry into IBIS. Do not submit rimfire caliber firearms (i.e., caliber 22), shotguns, or rifles of any other caliber.
- IBIS is state-of-the-art technology. This technology often changes at a rate much faster than procedure manuals may be written and distributed. If there are any questions about the system, contact the State Crime Laboratory Firearm and Tool Mark Section.

Firearms Reference Collection

The Firearm and Tool Mark Section maintains a reference collection of firearms confiscated by state and local law enforcement agencies.

Firearms may be submitted to the Firearm and Tool Mark Section Firearms Reference Collection by any law enforcement agency. It is **imperative** that submitted firearms be accompanied by a court order authorizing the State Crime Laboratory Firearm and Tool Mark Section to either (a) maintain the firearm(s) in the reference collection or (b) to destroy those firearms serving no useful purpose.

Revision History		
Effective Date	Version Number	Reason
9/1/2013	1	Original Controlled Document
10/16/2013	2	Added issuing authority to header