



# Forensic Services Guide

Washington State Patrol  
Forensic Laboratory Services Bureau

## Supplemental List of Changes

<b>Revision Date</b>	<b>Change</b>
5/20	Chapters numbered
5/20	Services updated
5/20	Shipping and safety alerts updated
5/20	CSRT section updated and reconstruction added
5/20	Biology section updated to include information on Y-STR and updated links for Harborview resources
5/20	Indecent exposure added for CODIS qualifying offense
5/20	MA sections updated to include consolidation of repetitive information and updated information
5/20	Firearms section updated
5/20	IBIS/NIBIN section updated to include new test fire procedures
5/20	Latent Print section update
5/20	Toxicology appendices removed and replaced by electronic link
5/20	Several grammar corrections made throughout

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## PREFACE

Technological advances constantly create a need to update evidence manuals. Examinations have either been developed or further refined since the last revision of the guide. These examinations require additional considerations for careful evidence handling and protection.

The handbook is organized to provide the following:

- A description of forensic examination services provided by the Forensic Laboratory Services Bureau and the WSP High Tech Crimes Unit. This includes services offered by each functional area work group, the types of analytical techniques used for each evidence analysis, and a list of services we cannot provide. In the case of services we cannot provide, we make every effort to help the investigator find a suitable alternative for analytical needs.
- General guidelines for the collection, preservation, and packaging of physical evidence.
- The procedure for submitting physical evidence.
- Procedures for handling various types of physical evidence.

This guide is not meant to be a comprehensive reference source for the collection and handling of physical evidence. An attempt has been made to briefly highlight the basic principles and requirements for dealing with the more common evidence types. The handbook cannot replace the caution, care, and probing reflection that are the requisites of the thorough, successful investigator. The investigator is encouraged throughout the handbook to call the crime laboratory for assistance. This is probably the best advice that we can provide: The wise investigator seeks counsel.

# INTRODUCTION

## FORENSIC LABORATORY SERVICES BUREAU

PO Box 42600  
Olympia WA 98504  
(360) 596-4120

The Forensic Laboratory Services Bureau (FLSB) of the Washington State Patrol (WSP), with bureau headquarters in Olympia, consists of three divisions: the Crime Laboratory Division, the Toxicology Laboratory Division and the Impaired Driving Section. The Crime Laboratory Division consists of laboratories in Seattle, Spokane, Tacoma, Marysville, Vancouver, Kennewick, and Olympia. All forensic toxicology services for the State of Washington are conducted at the Toxicology Laboratory located in Seattle. See the Toxicology Laboratory manual (page 110 of this manual) for guidance on collection and submission of samples for this division. The WSP High Tech Crimes Unit has its offices in Olympia. See page 107 for information regarding collection and preservation of computer evidence.

The Washington State Patrol FLSB is mandated by the Legislature to provide criminal justice agencies within the state the scientific investigative support associated with matters of a criminal nature.

This handbook offers a list of services offered in each functional area and methods of analysis typically used in these examinations. Also, the handbook describes the types of services and analyses the FLSB does not provide.

Evidence from all types of crimes is accepted from local, county, and state law enforcement agencies. Other agencies are assisted on a cooperative basis when a special need arises.

The Washington State Patrol FLSB is responsible for providing scientific support and expert testimonies relating to physical evidence from crimes by:

- Assisting at the scenes of crimes.
- Performing scientific examinations and evaluations of physical evidence in order to provide information relevant to criminal investigations.
- Participating in pretrial consultations and by providing reports, charts, graphs, and other exhibits for court purposes.
- Providing expert testimony in court trials, hearings, and depositions.
- Providing training to the criminal justice community in crime scene investigation, the role and significance of physical evidence, and the handling, collection, preservation, and packaging of physical evidence.

# Section One

## CRIME LABORATORY DIVISION

# 1.0 CRIME LABORATORIES AND SERVICES

## CRIME LABORATORY DIVISION

2203 Airport Way S, Bldg. A, Suite 250  
Seattle, WA 98134  
Telephone: (206) 262-6002  
FAX: (206) 262-6091

## LABORATORIES

### Seattle Crime Laboratory

2203 Airport Way S, Bldg. A, Suite 250  
Seattle, WA 98134  
Telephone: (206) 262-6020  
FAX: (206) 262-6033

- Services: Bio/DNA analysis  
Crime scene response  
Explosives analysis  
Fire debris analysis  
Firearms/tool marks examination  
Integrated Ballistics Information System (IBIS)  
Forensic chemistry  
Clandestine lab analysis  
Seized drugs analysis, including THC Quant  
Microanalysis (trace evidence)

### CODIS Laboratory

2203 Airport Way S, Bldg. A, Suite 250  
Seattle WA 98134  
Telephone: (206) 262-6054  
FAX: (206) 262-6091

- Services: Management of Statewide CODIS Database  
Convicted Offender DNA Typing

### Spokane Crime Laboratory

580 W 7th St  
Cheney WA 99004  
Telephone: (509) 625-5401  
FAX: (509) 625-5440

- Services: Bio/DNA analysis  
Crime scene response  
Explosives analysis  
Fire debris analysis  
Firearms/toolmarks examination  
Forensic chemistry  
Integrated Ballistics Information System (IBIS)  
Seized drugs analysis, including THC Quant  
Latent Prints Analysis  
Microanalysis (trace evidence)  
Questioned Documents

### **Tacoma Crime Laboratory**

2502 112th St E, Room 273  
Tacoma WA 98445  
Telephone: (253) 538-3207  
FAX: (253) 538-3275

- Services: Bio/DNA analysis  
Crime scene response  
Explosives analysis  
Fire debris analysis  
Firearms/toolmarks examination  
Integrated Ballistics Information System (IBIS)  
Forensic chemistry  
Clandestine lab analysis  
Seized drugs analysis  
Microanalysis (trace evidence)

### **Marysville Crime Laboratory**

2700 116th St NE, Suite P  
Tulalip WA 98271  
Telephone: (360) 654-1201  
FAX: (360) 654-1213

- Services: Bio/DNA analysis  
Crime scene response  
Explosives analysis  
Fire debris analysis  
Forensic chemistry  
Clandestine lab analysis  
Seized drugs analysis  
Microanalysis (trace evidence)

### **Vancouver Crime Laboratory**

1401 Kauffman Ave  
Vancouver WA 98660  
Telephone: (360) 993-3800  
Fax: (360) 993-3899

- Services: Bio/DNA analysis  
Crime Scene response  
Forensic chemistry  
Clandestine lab analysis  
Seized drugs analysis, including THC Quant

### **Kennewick Crime Laboratory**

143302 E Law Ln  
Kennewick WA 99337  
Telephone: (509) 734-5820

- Services: Seized drugs analysis  
Clandestine lab analysis  
Fire debris analysis  
Forensic chemistry

### **Olympia Laboratory**

3310 Capitol Blvd  
PO Box 42608  
Olympia WA 98504  
Telephone: (360) 596-4525  
FAX: (360) 596-4470

- Services: Crime scene response  
Latent prints analysis

## 2.0 CRIME LAB AREAS OF RESPONSIBILITY

Service Area	Case Type	Laboratory for Submission
ALL	Questioned Documents	Spokane
ALL	Convicted Offender database samples	CODIS - Seattle
Clark, Cowlitz, Lewis, Pacific, Skamania Wahkiakum	Latent Prints	Olympia
	Chemistry & DNA	Vancouver
	Firearms & Microanalysis	Tacoma
Yakima	DNA	Vancouver
	Chemistry	Kennewick
	Firearms, Latent Prints & Microanalysis	Spokane
Benton, Columbia, Franklin, Klickitat, Walla Walla	Chemistry	Kennewick
	DNA, Firearms, Latent Prints & Microanalysis	Spokane
Kittitas	Latent Prints	Spokane
	Chemistry, DNA, Firearms & Microanalysis	Seattle
Grays Harbor, Mason, Thurston, Pierce	Latent Prints	Olympia
	Chemistry, DNA, Firearms & Microanalysis	Tacoma
Clallam, Island, Jefferson, San Juan, Skagit, Snohomish, Whatcom	Firearms	Seattle
	Latent Prints	Olympia
	Chemistry, DNA & Microanalysis	Marysville
Adams, Asotin, Douglas, Chelan, Ferry, Garfield, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Whitman	Chemistry, DNA, Firearms, Latent Prints & Microanalysis	Spokane
King, Kitsap	Latent Prints	Olympia
	Chemistry, DNA, Firearms & Microanalysis	Seattle



## 3.0 PROCEDURES FOR EVIDENCE SUBMISSION

The following procedures should be observed to properly prepare and submit physical evidence to the crime laboratory.

### SHIPPING

- Most of the WSP CLD labs examine seized drugs. Some types of examinations, i.e. firearms, questioned documents, and latent prints, are performed only at a specific laboratory. Toxicology evidence is examined at the Seattle location. Refer to the map (p. 11) to identify the appropriate CLD laboratory. If you are unsure which lab would handle your specific evidence, check with your local crime laboratory to determine which state crime lab should receive the evidence.
- Choose a suitable shipment container so that the evidence can be securely packaged and preserved during shipping. Each evidence item, if possible (see next bullet point), **must** be packaged, uniquely identified, and sealed separately to avoid loss or contamination. Small items of evidence should be packaged in an envelope or plastic bag, no smaller than 5" x 7". Mark each evidence item with the agency case number and an item number. These identifiers must be on the evidence packaging or on the evidence item itself.
- If the evidence item cannot be fully packaged for submission to the laboratory (for example, a door, car hood, etc.), the area of interest must be protected and preserved when submitted to the laboratory, preferably by hand. The submitted item still must have appropriate identifiers to include the agency name, agency case number and unique item number.
- Ensure the evidence packaging is sealed, clearly marked, and allows the evidence to be repackaged easily after analysis. Specific guidance for proper packaging of different types of evidence is provided in subsequent sections.
- Place the completed [Request for Laboratory Examination](#) (Form WSP-3000-210-005) in an envelope and place inside the shipping container. Do not place the RFLE form inside sealed evidence. Laboratory personnel must be able to retrieve the form without breaking any evidence seals.
- Do not staple evidence to the RFLE and do not staple multiple evidence items together.
- Send the shipping container to the appropriate crime laboratory using a secure transport carrier with a formal delivery notification.
- To ship firearms and ammunition, please refer to the requirements of your carrier. Firearms and ammunition should be shipped in separate containers (see also the Firearms Evidence section).

**NOTE:** When threat-related items or mail are received or recovered, the first contact should be the FBI's Weapons of Mass Destruction coordinator. This individual has the responsibility for assessing the threat level and has a team of responders who can assess the nature of the threat, whether explosive, radiological or biological. The Crime Lab Division can analyze chemical and explosive materials and residues but is not equipped nor trained for radiological or biological material threats.

Once the FBI has screened the evidence it may be submitted to the crime lab for chemical or explosives analysis, if appropriate, or to the Washington State Public Health Department Laboratory in Seattle for biological and radiological analysis.

The FBI Office/Seattle Weapons of Mass Destruction coordinator can be reached at (206) 622-0460.

The Washington State Public Health Laboratory can be reached at (206) 418-5450.

## PERSONAL DELIVERY

- Personal delivery is the preferred method when the evidence is difficult to pack for shipping, very fragile, or if the evidence is perishable.
- Evidence concerning headlight filaments must be delivered in person to crime laboratories. See section titled "[Vehicle Lamp Evidence](#)" in the Materials Analysis section of this manual for further details on the proper packaging and handling of this type of evidence.
- Cases involving the analysis of possible unexploded explosives must be delivered in person to a laboratory that can complete these examinations. The agency will be asked to complete the CLD Explosive Safety and Evidence Checklist before submission ([Explosives Safety Checklist](#)). Note that post-blast evidence only may be shipped provided the investigator contacts the laboratory prior to shipping.
- For the above mentioned and other circumstances, the laboratory may require evidence to be picked up in person for return to the submitter.
- Personal delivery allows the investigator to discuss the case and its complexities with the forensic scientist. It is advisable to telephone the crime laboratory and arrange for a meeting time with a forensic scientist when the evidence is delivered.
- Remember that sending evidence by messenger increases the length of the chain of custody. Do not send verbal instructions regarding the case with the messenger.

## REQUEST FOR LABORATORY EXAMINATION (FORM 3000-210-005)

The Request for Laboratory Examination ([RFLE](#)) is the WSP form used for submitting evidence to the Crime Lab. This form must accompany all submissions of evidence to the crime laboratory. The form, which includes instructions for completion, is available on the CLD website (<http://www.wsp.wa.gov/forensics/crimlabs.htm>) and should be completed electronically.

Some important points to remember when completing the RFLE are as follows:

- Fill in all of the requested information. Incomplete forms cannot be accepted. If a suspect or victim name is unknown, indicate that in the appropriate block on the form.
- Link your current submission with any previous submission(s) from the same case. There is a convenient box near the top of the form for this purpose.
- Use the dropdown menu to list the most serious offense according to the Uniform Crime Reporting (UCR) system first. Other offenses may also be listed.
- The phone number and email address of the investigator are important. The forensic scientist(s) working on the case may need to discuss the case with the investigator.
- List the items in order of priority (most important first and the order in which the requester would like the evidence examined). Use the item numbers (or alpha-numeric name) assigned to the evidence and a very brief generic physical description to identify the item and its priority.
- In order to improve the efficiency and effectiveness of the forensic services that we provide to your agency, please contact the laboratory prior to submitting cases with 6 or more exhibits of physical evidence. A laboratory scientist will discuss with you the best evidence to submit and priority of each exhibit.

If you have any questions regarding the use of the RFLE (laboratory request) or the submission of evidence, call the crime laboratory serving your area. The addresses and phone numbers of the crime laboratories are listed in the instructions and on pages 8-10 in this manual.

Once the evidence is submitted, the Crime Lab may contact the investigator in order to determine the best approach to the examination of the evidence. If we do not have the analytical capability/resources to complete a specific examination, we will contact the agency with that information and possible solutions. The most effective use of Crime Lab Division resources may not allow us to examine every item submitted. For example, if multiple items are submitted in a single-suspect controlled substance case, only a single item may be analyzed and the agency would not receive pre-notification beyond what is described here. If specific items require analysis or if contact is requested prior to the examination, this should be clearly noted on the RFLE submitted with the evidence. Unless explicitly stated by the agency, submission of the RFLE is acceptance of CLD authority to approve technical deviations from test methods.

Sometimes it will be necessary to shift cases and evidence to one of the other CLD labs to make better use of our available laboratory resources. You can be assured that relative to a particular service in your local lab, each of the other CLD laboratories providing that same service has equal analytical capabilities for evidence that is transferred. This is not considered a contractor/subcontractor relationship for laboratory analysis, since the laboratories have the same capabilities.

If it is necessary for the lab division to use a non-WSP lab, either in a subcontractor relationship or because we do not offer a particular type of analysis, it is our responsibility to contact the submitting agency with this information and what may be expected from this transfer and subsequent analysis.

## 4.0 GENERAL GUIDELINES FOR THE COLLECTION, PRESERVATION, AND PACKAGING OF PHYSICAL EVIDENCE

The general instructions below will be helpful to the investigator. Evidence requiring special handling will be discussed in the appropriate sections of this handbook.

A few precautions are continually repeated throughout the handbook. The reason for the repetition is that these precautions are important. Failure to observe them may seriously affect the evidence examination and, potentially, the outcome of the case. Precautions regarding bloodborne pathogens are mentioned repeatedly due to the hazards that biological materials present.

The guidelines here express the manner in which the crime laboratory would prefer physical evidence to be collected, preserved, packaged, and submitted.

### PRECAUTIONS

#### Safety Alert

- Knives, broken glass, and other sharp objects must be packaged appropriately in puncture resistant containers.
- Do **not** submit any hypodermic needles, razor blades, or other sharps. Syringes will not be accepted. In rare circumstances, and only with documented prior approval by a Materials Analysis supervisor or designee, a syringe may be submitted. The crime laboratory will **not** accept any case under any circumstances that includes a needle alone, a syringe with the needle attached, or a syringe with the needle broken off or sheared.
  - *NOTE: Shearing or breaking of contaminated needles is prohibited. [29CFR1910.1030 and WAC296-823-14010] All syringes and needles are considered contaminated.*
- To prevent risk from fire and/or explosion, do not submit any items containing batteries, such as electronic smoking devices, vape pens and scales. These items will not be accepted unless the battery has been removed prior to submission to the laboratory. If the batteries cannot be removed from the a smoking or vaping device, the liquid reservoir should be removed and submitted separately. Please contact your local crime laboratory with any questions.
- When threat-related mail is received, the first contact should be the FBI's Weapons of Mass Destruction coordinator. This individual has the responsibility for assessing the threat level and has a team of responders who can assess the nature of the threat, whether explosive, radiological or biological. The Crime Lab Division can analyze chemical and explosive materials and residues but is not equipped nor trained for radiological or biological material threats. Once the FBI has screened the evidence it may be submitted to the crime lab for chemical or explosives analysis, if appropriate, or to the Washington State Public Health Department Laboratory in Seattle for biological and radiological analysis. The FBI Office/Seattle Weapons of Mass Destruction coordinator can be reached at (206) 622-0460.

## **Biohazard Contamination**

- The handling of items contaminated with biological fluids and stains presents hazards due to the possible presence of bloodborne pathogens. Hepatitis B (HVB) and Acquired Immunity Deficiency Syndrome (AIDS) are of particular concern to those handling liquid blood or bloodstained items. Special care must be taken when handling such materials. It is strongly advised to consult your agency "Bloodborne Pathogens Exposure Control Plan," which is required by WISHA (Washington Industrial Safety and Health Act).
- **Infectious evidence—Use universal precautions when handling biological specimens or stains.** Act under the assumption that the specimen or stain contains a dangerous pathogen, particularly Human Immunodeficiency Virus (HIV, the virus that causes AIDS) or HVB, and proceed accordingly. Use appropriate protective equipment, such as face, eye, hand, and shoe protection. Pointed and sharp-edged objects must be handled with extreme care. Searchers must not place their hands into any space that is not first visually inspected (no "blind" searches). Eyes must be protected if splashes are likely to occur.
- Eating, smoking, and the drinking of beverages at the crime scene is prohibited. Shoes should be protected from blood on the floor or grounds. The tracking of blood beyond the perimeter of the crime scene must be avoided. Careful processing of the crime scene will minimize the risk of contamination of evidence and danger to the investigator.
- Good personal hygiene must be observed. The hands should be washed thoroughly after the removal of protective gloves, even if the gloves are not cut or punctured. Used protective gear must be disposed of in a manner specified by state and federal regulations.
- Any questions should be directed to the following:  
Industrial Safety and Health Division, Department of Labor and Industries, Olympia: [www.lni.wa.gov](http://www.lni.wa.gov).

## **GENERAL GUIDELINES**

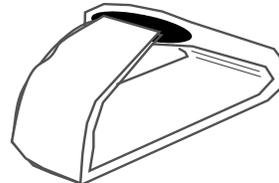
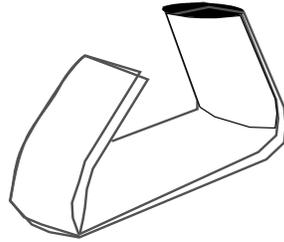
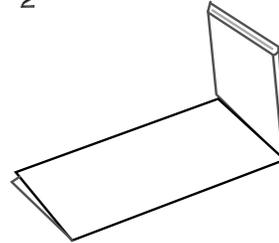
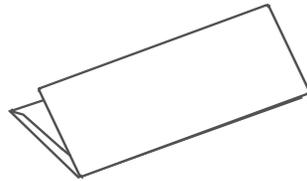
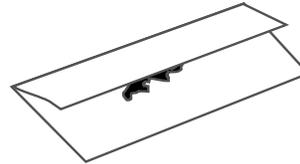
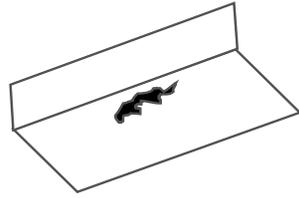
- Meet legal requirements before entering the crime scene or collecting evidence.
  - Determine if a search warrant or court order is necessary before proceeding.
  - Maintain a chain of custody. Proper documentation is necessary to prove the chain of possession from the time of collection until entered in evidence in court. It may be necessary to prove the integrity of the evidence at some later time.
- Take extra caution when collecting evidence, especially if you are the first responder to a scene. Use gloves and possibly face masks to prevent contamination of potential biological evidence. Take steps to avoid contamination of latent evidence, such as fingerprints, shoeprints, etc.
- Collect a sufficient number and amount of samples. Remember that most of the time it is difficult, if not impossible, to return to the crime scene for more samples.
  - Collect small items of evidence on clean pieces of paper and fold the paper, seal, and label (see illustrations of paper folds at the end of this section). To avoid loss, seal these smaller items into a larger container such as an envelope or plastic bag no smaller than 5" x 7".
- Labeling evidence: The following information is to be noted on the container or attached tag:
  - Agency name and case number
  - Agency item number (same as listed on the RFLE)
  - Brief description of item

- Source of item/name of subject (use actual name, not “suspect/victim”)
  - Location (where found)
  - Date/time of collection
  - Name or initials of person collecting item
- Preserving evidence: The general rule is to submit the evidence in the same condition as when collected. As with nearly all rules, there are exceptions. These exceptions are noted in the discussion of each evidence type (e.g., some evidence must be dried, refrigerated, or frozen).
- The evidence must not be allowed to spoil, deteriorate, evaporate, or in any other manner be diminished in content or evidentiary value.
  - Biological stains, leather goods, plaster casts, and vegetable matter must be thoroughly dry before submission. After drying, this type of evidence is best stored in clean paper containers. Do not use plastic containers.
- Do not contaminate the evidence: The evidence must be handled in a proper manner so that no extraneous material or substance is added.
- Place evidence directly into a container. Avoid placing the evidence on a surface, particularly one that is soiled or that may contain material similar to that of the evidence.
  - Handle the evidence as little as possible.
  - Package items separately so that transference of possible contaminants does not occur. Care must be taken to avoid leakage and/or breakage so that liquid samples, such as blood, do not leak on other items of evidence.
  - Protect a stain with a clean piece of paper so that when clothing is folded, the stain will not be transferred to another portion of the clothing. An accidental transfer may cause the forensic scientist to misinterpret the stain pattern.
- Sealing evidence:
- Use nonremoveable tape or evidence tape to seal evidence. Evidence packages are properly sealed if the evidence inside is protected from loss or contamination and an attempt to enter the package would be noticed. The open flaps of envelopes must be sealed with either packing or evidence tape. Scotch tape and staples do not constitute proper seals. Each seal must be initialed so that the initials touch both the tape seal and the item’s packaging. **It is also a good idea to include the date across the tape seal.** Particular care must be taken when sealing containers with seized drugs.
  - Bottles and jars must be capped tightly to avoid leakage and then sealed with tape. The tape must extend across the top of the lid and down both sides of the body of the container.
  - Take all precautions to avoid the loss of evidence. Package and seal the containers to avoid leakage, tearing, or the sifting of evidence through cracks or small openings. Small packages should be over sealed into an envelope or plastic bag not smaller than 5” x 7”. Consider a double package process to protect trace evidence from being lost in a larger outer container.
  - It is not always practical or necessary to seal evidence in a container in order to protect it from loss, cross contamination or deleterious change. For example, containerization and sealing are not necessary for large items such as furniture, doors and windows, and automotive components which cannot be packaged and sealed in a practical manner. In

this case, the area of the item that has forensic importance should be covered so that the area is protected. The covering should be clearly marked indicating the specific area of interest.

- Control/Reference samples:
  - Control (reference/known) samples and/or comparison samples are necessary when comparisons are to be made.
  - The substrate samples to determine whether the material (substrate) on which a stain is found interferes with the stain analysis may be submitted but will only be examined if necessary. Do not use envelopes smaller than 5" x 7".
  
- Shipping evidence:
  - Ship evidence by a secure transport carrier with a formal delivery notification.
  - Firearms and ammunition should be shipped in separate containers. For more details, please refer to the Firearms Evidence Section.
  - Follow special instructions involving the shipment of biological specimens. See the Biological Section of this manual or contact your local laboratory.
  - If the evidence is very fragile (such as vehicle lamps) or in some other way difficult to ship, it should be delivered personally.

## 5.0 HOW TO MAKE A PAPERFOLD

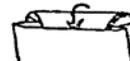
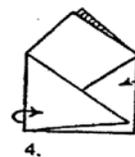
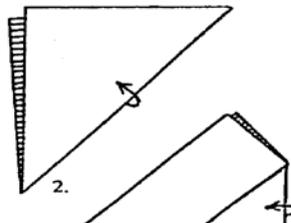
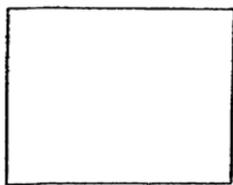


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## 6.0 CRIME SCENE RESPONSE TEAM

### INTRODUCTION

The complexity and demands of a major crime may overwhelm the resources of a law enforcement agency. Yet it is incumbent upon all agencies, regardless of resources and training, to perform a thorough and complete investigation. For such needs, the Crime Scene Response Team (CSRT) was established to respond to calls for crime scene assistance from law enforcement agencies within the state. The CSRT consists of forensic scientists and is a free service available for response 24 hours a day.

### GOALS AND OBJECTIVES

The CSRT will respond to requests by law enforcement agencies and assist the agency in a thorough assessment and examination of the physical crime scene. This will be accomplished by:

- Responding in an expeditious manner to minimize the loss of evidence.
- Assisting in the processing of the crime scene by the recognition, collection, and preservation of pertinent physical evidence.
- Recording the crime scene in an appropriate manner, including photography, sketching, diagrams, and note-taking.
- 3D laser scanning and forensic mapping
- Providing reconstruction of events where warranted.
- Providing the requesting agency with a written report.
- Providing expert testimony as needed.

### CALLOUT CRITERIA

The WSP CSRT does not currently have the resources and personnel to respond to every crime scene. Consequently, the CSRT is limited to providing assistance primarily to major crimes such as the following situations:

- Death investigations (except traffic fatalities)
- Sexual Assaults
- Assaults
- Fatal and non-fatal use of force incidents involving a law enforcement officer
- Other crimes as warranted by circumstance and resources

### CALLOUT PROCEDURE

#### Crime Scene Response Guidelines:

The following are guidance criteria to be considered by the CSRT Manager in evaluating calls for assistance. These criteria are not exhaustive and consideration of appropriate response will depend both on the nature of the case, the needs of the requesting agency, and the availability of scientists. Whenever appropriate, response will be scheduled for normal business hours. Examples of this would be vehicles which have been secured and impounded or are in police custody.

*Before responding to any request, the requesting agency must have secured the scene and obtained a valid search warrant or legal permission to examine the scene.*

Criteria to respond immediately:

- For investigation of a homicide where the body (bodies) of the victim (suspect) is still at the scene and the agency needs any of the following that cannot be delayed: bloodstain pattern analysis, trajectory analysis, latent print evaluation and collection, scene reconstruction, and evidence recognition and collection.
- Where the suspect(s) are unidentified and remain at large, presenting a danger to the public if not identified as soon as possible.
- For investigation of a serious crime where it is beyond the expertise of the requesting agency to best preserve and collect evidence that may deteriorate due to the weather. Examples of this would be buried or scattered body remains.
- Any investigations that involve the closure of public areas, such as an officer involved shooting on a roadway.

Criteria for Non-response:

- A scene that has been thoroughly searched by the agency and the Crime Lab is only being called to confirm that no further useful forensic evidence is present.
- A scene where the agency has no good investigative information that the vehicle/residence/location is associated with the crime.
- A scene where there is no compelling forensic reason to respond. An example of this is searching for hairs/fibers or DNA samples in a vehicle to which it was known that the victim/suspect had prior access.
- A simple scene where verbal directions on evidence collection and preservation can be given to a Detective/Evidence Officer.

Contact Information:

The requesting law enforcement agency can request assistance from the CSRT by:

- Contacting the CSRT Manager or designee at (253) 255-3064 Contacting the local WSP Communications Center

The CSRT Manager or designee will communicate with the requesting agency to assess the agency needs and determine the level of response.

## **RELATIONSHIP TO REQUESTING AGENCY**

The requesting agency will retain the responsibility, authority, control, and direction of the overall investigation, as well as all collected physical evidence. The CSRT does not transport evidence from the scene.

The requesting agency will be kept informed at all times of the status of the crime scene investigation.

The CSRT will not engage in any activity deemed unsafe, unethical, or in violation of accepted crime scene practices, WSP regulations, or Washington State laws.

Any requests for information from the news media at the scene will be referred to the requesting agency.

The CSRT will provide reports to the agency.

CSRT responders will be available for court testimony.

## **RECONSTRUCTION SERVICES OFFERED BY CSRT**

The CSRT scientists also have the capability to examine physical items of evidence in the laboratory as part of a crime scene reconstruction request. Crime scene reconstruction is the application of scientific principles to describe what events took place during the commission of a crime. Crime scene reconstruction includes:

- General crime scene reconstruction
- Bloodstain pattern analysis and reconstruction
- Shooting incident reconstruction

During the reconstruction process, additional analysis may be required. This may include but is not limited to:

- Diagrams
- Photographs
- Experimentation
- Review of relevant scene and/or laboratory reports
- Physical evidence examination

## **CASE ACCEPTANCE GUIDELINES FOR RECONSTRUCTION REQUESTS**

The following case acceptance guidelines were established to improve our efficiency and promote analysis of evidence that is most likely to yield results. These guidelines will support efforts to improve customer service by ensuring that all relevant evidence is submitted for analysis prior to the start of examination. There is great importance to and benefit from communication between customers and our CSRT staff regarding case submissions.

- Reconstruction requests are typically labor intensive cases that require extensive review of reports, photographs, as well as items of physical evidence. As such, all requests for reconstruction must be approved by the CSRT Manager prior to acceptance. Please call (253) 255-3064 to discuss the nature of the reconstruction request prior to submitting evidence to the crime laboratory.
- In cases of bloodstain pattern analysis on clothing, a tiered approach to evidence analysis will be employed. Communication between the customer and CSRT Manager will identify which articles of clothing are most likely to answer the questions relevant to the request.
- Due to the time required to complete most reconstruction requests, it is requested that evidence be submitted at least 60 days prior to cases to a court mandated completion date.

## 7.0 BIOLOGICAL EVIDENCE

### INTRODUCTION

The Washington State Patrol Biochemistry/DNA section is responsible for the forensic biochemical analyses of body fluids, stains, and cellular material (not associated with bodily fluids) and the DNA typing of biological evidence.

The majority of examinations begin with a screening procedure to identify the presence of biological material on items of evidence. When biological material has been identified from the screening process, a sample of the material can be taken for DNA analysis. Biological screening can involve a series of chemical tests to indicate the presence of a bodily fluid (Serology), or may be as simple as swabbing an item that has been reportedly touched or contacted in some way. The WSP crime lab system is capable of performing presumptive and confirmatory tests for blood and semen, and presumptive tests for urine, saliva, and feces. Limited “species of origin” testing to determine the possible nonhuman source of a biological stain can be provided for cat (felidae), dog (canidae), deer (cervidae), chicken (phasianidae), swine/pig (suidae) and cow (bovidae). Human DNA analysis (or typing) is the only type of DNA testing performed by the WSP Crime Laboratory. DNA typing is a process that involves chemically removing DNA from cells and applying molecular biology techniques to obtain a DNA profile that can be compared to other profiles. DNA profiles may be obtained from biological evidence items, or from reference/known samples collected from known individuals. DNA can be obtained from many biological sources (e.g. blood, semen, saliva, hair, organs, skin, urine, and feces). DNA typing performed on biological evidence can be used to include or exclude an individual(s) as a possible source of biological evidence and/or can be compared to the Combined DNA Index System (CODIS).

While it has been recognized that there is a potential for DNA recovery from touch samples, where the analyst is asked to target DNA from skin cells deposited by handling an item, this kind of evidence can present challenges in trying to interpret the resulting data. Samples that are likely to have been handled by multiple sources or have been limited in handling/touch by the suspect can result in complex mixtures of DNA from multiple donors or limited information, respectively. Analysis of these samples often leads to limited (or no definitive) conclusions regarding inclusion or exclusion of a particular person of interest. As such, the WSP Crime Laboratory will normally view these handling/touch samples as ‘samples of last resort’ and they will not be analyzed if they are considered unsuitable and/or other evidence with a higher potential for developing a probative profile is available.

The conclusions drawn from DNA evidence by DNA analysts can help law enforcement investigators:

- Identify a potential perpetrator.
- Exclude individuals not involved in the crime being investigated.
- Reconstruct the events related to the crime.
- Locate the crime scene.
- Determine probability of parentage in criminal cases.
- In missing persons and unidentified remains investigations.

### CASE ACCEPTANCE GUIDELINES FOR BIOLOGICAL EVIDENCE

In an effort to balance our limited resources with the needs of our customers, the increasing demand for DNA testing requires us to carefully evaluate lab requests that we receive. Despite the most current technologies to improve turnaround time for cases, our system still receives more cases each year than we are able to complete. Consequently, our DNA casework backlog continues to grow across the state.

The following case acceptance guidelines were established to improve our efficiency and promote analysis of evidence that is most likely to yield results. These guidelines will support efforts to improve customer service by reducing the backlogs and providing timely investigative information. There is great importance to and benefit from communication between customers and our DNA staff regarding case submissions.

DNA Case Acceptance Criteria:

- As discussed in the INTRODUCTION above, touch DNA samples rarely provide interpretable or CODIS-eligible profiles. Current laboratory resources cannot support the routine analysis of touch DNA samples (samples collected specifically for skin cells from handling objects). (Note that **wearer** DNA samples are generally not included in the touch category.) Examples of touch DNA samples include firearms evidence (bullets, magazines, cartridge cases, and firearms), swabs collected from firearm evidence, and samples collected from “public” surfaces (surfaces which have been in routine contact with many people). Exceptions may apply for cases involving violent crimes, if there is no other evidence, if applicable reference(s) are provided at the time of submission, and if written authorization is given to complete analysis on the submitted item(s) using the [Authorization for Consumption of DNA Evidence](#) form. Submissions of touch DNA cases should include discussions between customers and DNA staff.
- A “tiered-approach” to evidence submission will improve customer service. Customers should discuss evidence submissions with DNA staff, and first submissions will normally be limited to 5 items (not including reference samples.) These items must be listed on the required [DNA Case Supplemental Information](#) form in order of requested priority. Additional items may be submitted in a second tier through discussion with the DNA scientist or DNA supervisor.
- Property crime submissions will be limited to cases involving substantial property loss, cases that are part of a series, have a sexual component, involve crimes against government agencies, are associated with sentencing enhancements, involve thefts of large quantities of dangerous or hazardous materials, or indicate a public safety threat (the victim is home at the time of occurrence). However, we will discuss and negotiate property crime submissions in cases involving extraordinary circumstances. Property crimes should be limited to the submission of 2 items, and will require the [Authorization for Consumption of DNA Evidence](#) form and any suspect reference samples at the time of submission. Additional items may be submitted in a second tier through discussion with the DNA scientist or DNA supervisor.
- RCW 70.125.090 requires that all law enforcement agencies submit a Request for Laboratory Examination form for all sexual assault examinations kits within thirty days of receipt if consent has been given by the victim or the victim is under the age of eighteen and not emancipated. Evidence associated with active investigations may be submitted at the same time as the Request for Laboratory Examination. For nonactive investigations, a Request for Laboratory Examination (plus other supporting documentation listed below) should initially be submitted; evidence will only be accepted when requested by a DNA scientist or supervisor.

- Customers might also be asked to provide an [Authorization for Consumption of DNA Evidence](#) form if appropriate, to help expedite analysis. When possible, every effort is made to preserve at least half of the evidence; however, when dealing with limited samples, there may occur a need to consume the evidence during the course of DNA analysis. The WSP Crime Lab requires that the submitting agency (or a prosecutor) provide written authorization to consume the evidence, when needed.
- The customer should provide appropriate contact information (email, phone number). Please return our inquiry calls or emails within 21 days to avoid cancellation of the lab request and return of the evidence.

### Required At the Time of Initial Submission

To improve the quality of customer service, we will request that the following items accompany initial case submissions:

- A case summary or copy of the incident report and the *Sexual Assault Kit Report* form (if applicable). The case information should contain a brief description of where (or who) evidence items came from. (Note that a forensic scientist may still need to contact you to obtain additional information about the case.)
- [DNA Case Supplemental Information](#) form (in addition to the RFLE.) Please indicate the evidence priority on this form.
- Reference samples from victim(s), suspect(s), and elimination/consensual partner(s) are required at the time of submission if possible. If you cannot provide references, please indicate the reason on the [DNA Case Supplemental Information](#) form.
- [Authorization for Consumption of DNA Evidence](#) form (this is required at the time of submission for sexual assault submissions with no charged individual and all property crime submissions.)

Note: The Firearms, Materials Analysis, Questioned Documents, and Latent Print Sections remain unaffected by this policy. For cases involving multiple examinations, this policy will only apply to evidence on which DNA analysis is requested.

## **TECHNOLOGY UTILIZED**

DNA is chemically removed (or extracted) from biological cells. Real Time (RT) polymerase chain reaction (PCR) instruments determine how much DNA is present in the extracted sample (quantitation). Molecular biology techniques are then applied to obtain a DNA typing profile. A specific amount of DNA is then amplified using the PCR process, which targets the 20 core short tandem repeat (STR) loci recommended by the FBI and recognized by the Combined DNA Index System (CODIS), plus Amelogenin and DYS391 for sex determination and Penta D, Penta E, SE33, DYS570 and DYS576 for higher discrimination. Although it may not be possible to obtain results at all loci for every sample, the core STR loci that may be examined are: D3S1358, D1S1656, D2S441, D10S1248, D13S317, D16S539, D18S51, D2S1338, CSF1PO, TH01, vWA, D21S11, D7S820, D5S818, TPOX, D8S1179, D12S391, D19S433, D22S1045 and FGA. The amplified DNA is then run on a capillary based gel electrophoresis instrument, resulting in a DNA type for each locus. The typing results at each locus are compiled into what is referred to as a DNA typing profile.

If the amount of DNA in a sample appears insufficient to obtain a profile, the analyst has discretion to not amplify the sample. If multiple samples with similar probative value are quantitated (e.g. sexual assault evidence collection kit swabs), the analyst may choose which sample or samples (if any) to amplify based on case approach considerations, which may include discussions with the submitting agency and/or prosecutor.

Robotic liquid handling systems are used by the laboratory and may be employed during certain steps of the DNA typing process.

## **Y-STR**

Y-STR analysis is similar to the standard DNA service offered, but focuses exclusively on male DNA. Y-STR analysis is generally considered only after STR testing has been conducted. If Y-STR testing is desired in a case where limited male DNA was detected, please contact the laboratory to discuss Y-STR options.

- Y-STR analysis should be utilized when no STR autosomal profile was developed to aid in the investigation.
- Relevant reference sample(s) (consensual sex partners and male suspects) must be submitted for Y-STR comparisons.
- Y-STR analysis typically will not be performed when multiple paternal male relatives are associated with a case.

### **Benefits and Applications:**

- Samples where large quantities of female DNA may be obscuring the smaller male DNA component. Examples of appropriate cases and samples include:
  - Sexual assault cases where only digital penetration or penile penetration without ejaculation (or with use of a condom) occurred or when only oral assault occurred.
  - Sexual assault cases where the perpetrator has a low sperm count or is vasectomized.
  - Fingernail clippings from female victims, especially homicide victims, when it is expected that the perpetrator was male and that some sort of struggle may have occurred.
- Cases where a reference sample from a male victim or suspect is unavailable, but a sample from a male relative from the same paternal line is available.
- May be considered for use on cold cases that were previously unsuccessful with standard DNA typing. Please check with the lab that conducted the original testing. The original DNA extracts and/or additional suitable evidence items from the case must be available.

### **Limitations:**

- All males with the same paternal lineage will have the same profile and thus will be indistinguishable from one another (i.e. a Y-STR profile is not unique and cannot identify a specific, single individual).
- Y-STR profiles are not eligible for CODIS so relevant reference samples must be submitted for comparison to any profiles generated before the testing will be attempted.
- Statistical weight of a Y-STR profile is significantly lower than standard DNA testing, so all other samples in a case that are potentially suitable for standard DNA testing should be exhausted before Y-STR testing is attempted.

The Washington State Patrol Crime Laboratory does not currently offer mini-STR typing, mitochondrial DNA typing (mtDNA), single nucleotide polymorphism (SNP) technology, animal DNA typing, or plant

DNA typing. The WSP laboratory should be contacted if any of these services are required, and the laboratory may be able to provide assistance to the agency in determining alternative laboratory facilities for testing.

## **BIOLOGICAL EVIDENCE UNIVERSAL PRECAUTIONS**

### **ALL EVIDENCE ITEMS SUBMITTED FOR BIOLOGICAL TESTING MUST BE HANDLED USING UNIVERSAL PRECAUTIONS**

The handling of biological fluids and stains presents hazards due to the possible presence of pathogens. Investigators (and other personnel transporting biological material) must use universal precautions (i.e., treat all evidence objects as sources of pathogens and take appropriate protective actions) when processing or transporting evidence.

Gloves must always be worn when handling potential biological evidence. Gloves must be changed frequently and always between handling evidence items (to avoid contamination between items). Additional personal protective equipment including Tyvek<sup>®</sup> suits, boot covers, masks, etc. may be needed to protect the collector and/or the potential biological evidence. No smoking, eating, or drinking, should be done around potential biological evidence items. Talking over or around potential evidence (such as cell phone conversations) should be avoided. Coughing, sneezing, or spitting around biological evidence should also be avoided. Masks are highly recommended when collecting evidence for touch/trace DNA.

Good personal hygiene must be observed. The hands should be washed thoroughly after the removal of protective gloves, even if the gloves are not cut or punctured. Used protective gear should be removed when exiting the crime scene and must be disposed of in a manner specified by your agency's Exposure Control Plan and health and state regulations. Please consult your agency Bloodborne Pathogens Exposure Control Plan, which is required by WISHA (Washington Industrial Safety and Health Act).

Any questions regarding health and safety should be directed to local health authorities or to the Industrial Safety and Health Division, Department of Labor and Industries, Olympia, Washington, at [www.lni.wa.gov](http://www.lni.wa.gov); Safety and Health Hot Line, 1-800-423-7233.

## **COLLECTION, PRESERVATION, AND SHIPPING OF BIOLOGICAL EVIDENCE**

### **Collection**

Evidence may be recovered from many sites: from the crime scene, from an evidence dump site, from a vehicle involved in the crime, from the suspect's body and clothing, and from the victim's body and clothing. In sexual assault cases, evidence such as penile swabbings from a suspect, the suspect's underwear (for victim's DNA), and fingernail/tip samples may be useful evidence. When appropriate, as much evidence as possible should be collected as quickly as possible from the bodies of the victim and suspect. Transitory evidence should be collected as the first priority. Biological evidence is fragile and can easily be destroyed. The recognition and recovery of such evidence must be performed properly by the investigator in order to make the best use of it. Please call your local laboratory for case specific recommendations.

The DNA laboratory should be contacted before any biological evidence is delivered for processing. The first submission of DNA evidence is limited to five items plus reference samples. The laboratory can help determine what evidence should be delivered and how that evidence should be processed to provide the best forensic examination possible. When several forensic disciplines are involved with one item of biological evidence, the item may be shipped between WSP laboratories for the examination to be completed in the appropriate order for that item (e.g. latent prints).

It is imperative that the victim receive immediate medical attention. Promptness of an examination will also permit medical personnel to retrieve any physical evidence before being lost through washing or cleansing. Commercial kits are available to assist the attending medical personnel in collecting specimens and controls required by the crime laboratory. The examination should be conducted in a manner which avoids the loss of evidence. The preferred sequence of the examination by medical personnel is to first examine and collect the clothing, then the external areas of the body, and finally the internal areas of the body.

The Harborview Abuse and Trauma Center has established guidelines for sexual assault medical evaluations and evidence collection for adults, adolescents and children. Please see the professional resources provided under the medical guidelines at Harborview's [website](#) Recommended Guidelines Adult and Adolescent):

There are generally three methods of collection recommended by the WSP Crime Lab:

- 1) Collect the entire item.
- 2) Collect a portion of the item.
- 3) Remove the biological material from the item.

#### Collecting the entire item

The best way to collect an item of biological evidence is generally to collect the entire item. This method of collection allows the laboratory to process the evidence with the potential involvement of several forensic disciplines (e.g. latent prints, materials analysis). After a sexual assault in which the suspect has deposited body fluid evidence on the victim, it is critical to immediately collect articles of clothing worn during the assault. These may not be the clothing items the victim wears to the hospital. In some cases it may be important to collect the clothes the suspect was reportedly wearing at the crime scene.

#### Collecting a portion of the item

If the entire item is not able to be collected because the item is too large (e.g. walls, concrete, flooring), a portion of the entire item may be removed. This method is preferred if it is necessary to preserve a stain pattern on a large item. A large enough area around the stain/pattern should be taken to avoid having the cutting instrument come in close contact with the biological material.

#### Removing the biological material from the item

**Note:** Do not submit swabs previously used for presumptive blood testing for DNA analysis. A separate swab should be used for sampling DNA evidence after a stain has given a positive presumptive test for blood. The chemicals in the presumptive tests interfere with DNA testing.

**Visible staining:** If the item (or a portion of the item) is not able to be collected, the visible stain may be transferred off the object by swabbing(s) or scraping.

- **Swabbing:** Moisten a sterile cotton swab with clean water\* (not dripping wet, just moist enough to dissolve the stain) and rub the stain. If the stain is small, collect it on a small area of the swab. Collect larger stains on as many swabs as necessary. Use a dry swab afterward to collect any remaining residue.
- **Scraping:** This should be performed as a last resort since flakes can create contamination. If the body fluid can be easily flaked off a surface, use a new/sterile scalpel or razor blade and scrape it onto a clean piece of paper. If more than one stain is to be collected, use a new/sterile blade for each scraping to prevent cross-contamination. Fold and tape the paper closed.

**Non-visible biological material:** If the item (or a portion of the item) is not able to be collected, but a non-visible stain or cellular/contact material is suspected to be present, the area may be swabbed. Latent print analysis may need to be considered before an area is generally swabbed\*\*.

- If the stain is not visible or to collect cellular/contact material from an item, moisten a sterile cotton swab with clean water\* (not dripping wet) and swab the area on the item. Use a dry swab afterward to collect any remaining residue. This technique is referred to as the “wet/dry technique”.
- The wet/dry swabbing technique should be used for swabbing areas on the body that may have been licked, kissed, or bitten.

**Lotions or lubricants:** Collect large deposits of oils, lubricants, creams or ointments in a glass test tube or vial. Otherwise, wipe the area of the deposit with a sterile damp swab(s) and follow it with a sterile dry swab(s). Sterile gauze may also be used to collect the deposit. A substrate control may be collected from a deposit-free area, adjacent to the deposit.

\*It is always preferable to use sterile, deionized water to moisten swabs. If this is not possible, clean water should be used. Commercially bottled water may be an appropriate option. A control swab, moistened with the water used then air dried, may be collected, however these controls are not generally processed at the crime laboratory.

\*\*For collection of evidence that yields limited DNA, such as touch/handler/wearer cellular samples and small stains, certified DNA-free swabs should be used. Swabs labeled only as ‘sterile’ may contain contaminant DNA from the manufacturer and can produce DNA profiles that are not forensically significant. For further information on certified DNA-free swabs, contact the crime laboratory.

### M-Vac® Collection

The M-Vac® is a wet-vacuum DNA collection system. It is possible to use this device to collect DNA from a variety of porous and non-porous materials. M-Vac® collection for DNA analysis is available in each DNA laboratory within the WSP Crime Lab system. The WSP Crime Lab recommends agencies contact their local WSP Crime Lab if this service is requested.

Due to the potential for removal of trace evidence and mixing of discrete stains present on an item, the WSP Crime Lab recommends M-Vac® collection be performed at the WSP Crime Lab, and not at individual agencies. The M-Vac® has the ability to collect trace amounts of DNA from the substrate, and as such, complex mixtures, and contaminant profiles may be detected in DNA extracts produced from this collection method. If an agency prefers to perform M-Vac® collection at their location or on scene, with subsequent submission of the M-Vac® product (dried filter/filter device) to the WSP Crime Lab for DNA analysis, an elimination sample from the M-Vac® operator/collector *must* be submitted along with the evidence.

### Preservation

Bacterial action, mold, sunshine, moisture, and warm temperatures can damage the evidentiary value of biological evidence due to the damage or destruction of DNA.

Proper packaging:

- Each item, including each article of clothing, should be packaged separately. Transference of materials between items must be avoided.
- Use clean paper bags, envelopes, cardboard boxes, or some other breathable packaging material to package evidence to avoid the accumulation of moisture inside the package. Do not use plastic bags or containers. The presence of moisture enhances bacterial growth.
- Comforters, blankets, pillows, coats, and other large items should be packaged in a way that allows them to be repackaged easily at the end of the forensic examination.
- Label each item with a case number, item number, date, item description, source and/or location.
- Evidence tape or other nonremovable tape should seal any openings. Initial across the tape. The date may also be appropriate to add across the seal. All packaging should have tape over any openings to ensure that small particles are not lost. Only tape or self-adhesive seals should be used. No envelopes should be licked to seal.
- Evidence must be properly packaged and sealed to prevent any loss or contamination.

Special packaging considerations:

- Bottles/containers with liquid: The liquid should be removed using a pipette or by poking a hole in the bottom of the receptacle. Liquid should not be dumped out due to potential biological evidence around the opening/lip/mouth area of the container. The removed liquid may be preserved in a sealable plastic container. If an examination is needed for ignitable liquids, refer also to the Fire Debris section of this manual or contact your local laboratory.
- Condoms: For condoms with a small amount of liquid, the liquid should be allowed to dry before packaging. If the liquid cannot be dried, the condom should be packaged so that the liquid cannot spill out of the condom. A new/sterile twist tie or clamp may be used so biological material from the inside of the condom is not mixed with the biological material on the outside of the condom. Secure the condom in packaging such as a plastic specimen jar or conical tube to keep it upright and leak proof, and then freeze the item.

Proper drying:

Evidence items and stains must be thoroughly dried at room temperature without the use of heat. Partially dried items will be subject to bacterial action and mold, destroying their value as evidence.

Proper storage:

DNA typing results can be obtained from evidence stored refrigerated, frozen, or at room temperature for an extended period of time. If at room temperature, biological evidence should be stored in a cool, dark, and dry place.

- Metal objects/rocks: guns, knives, rocks, aluminum baseball bats, etc. should not be frozen, as condensation forms upon removal of these objects from the freezer. These items should be stored dry at room temperature.

**Shipping**

Items must be packaged in a way that will allow them to be handled and transported safely. A few examples include:

- Knives/Firearms/sharp items: should be placed in a new cardboard box and secured with plastic zip-ties. (See the firearms section of this manual for shipping safety procedures for firearms).
- Glass: should be secured in a cardboard box, padded, marked “fragile” and “glass” on the outer packaging.
- Blood tubes: any glass tube packaged for shipping must be cushioned and protected from breaking (this includes tubes used to store sexual assault swabs). Wrap the tube in absorbent material (e.g., enough tissue paper or towels to absorb the contents if it should break) and place in a small, resealable plastic bag. Tape top edges together with evidence tape. Place the bag into a second bag and seal, and then place this into a Styrofoam mailing container and seal container. Styrofoam containers are commercially available. Blood tubes should never be frozen, they may be refrigerated. If liquid blood tubes are included in the sexual assault kit, they should be removed when the kit is placed in freezer storage.

Items should not be marked “biohazard” or “blood” on the outer packaging for shipping.

## REFERENCE/KNOWN SAMPLES

A reference/known sample is taken from an individual under supervised circumstances. A chain of custody must be maintained on the sample from the time of collection. The DNA typing profile obtained from the reference sample is compared to any profiles from the evidence items. The reference sample may be collected by law enforcement, medical staff, or correctional staff. Offender DNA collection kits supplied by the WSP CODIS Crime laboratory should not be used for the collection of DNA reference samples involved in criminal cases. The reference sample should be shipped to the WSP laboratory doing the analysis on the evidence items in the case. Reference samples that arrive separate from and later than the other evidence may cause a delay in the processing of the case. If reference samples are not submitted with the initial laboratory request, the request may be cancelled unless other arrangements have been made in advance or sufficient justification is provided on the *DNA Case Supplemental Information form*. “Sufficient justification” may include an inability to obtain reference samples.

A “secondary” reference sample is a personal item (e.g. toothbrush, hair brush, comb) that is believed to be from an individual. On rare occasions, this type of reference may be used when a “primary” reference is not available. Contact the crime laboratory for more information on submitting secondary reference samples.

The reference samples that should be submitted are dependent on the case circumstances:

- Reference/known samples should be submitted from the victim(s), and suspect(s).
- References may also be required for elimination purposes (e.g. a consensual partner of a sexual assault victim).
- In missing person’s investigations, references may be requested from family members. Family member reference samples submitted to a WSP Crime Laboratory shall be accompanied with a [\*Consent for Family Reference Sample Collection, Testing, and CODIS Entry\*](#) form (available on the WSP CLD website: <http://www.wsp.wa.gov/forensics/crimlabs.htm>).

- If an evidence sample profile matches to an offender profile in the CODIS database providing an investigative lead, a reference sample will be requested to confirm the “hit.” The following are acceptable reference samples:

Methods of reference sample collection:

- A buccal (saliva) sample on swabs or FTA<sup>®</sup> paper\* is the easiest method of collection for known/reference samples. When collecting a buccal sample, the individual’s mouth should be free of food, tobacco, and other substances. It may be appropriate to have the individual rinse and spit before the collection of the sample. The buccal sample can be collected by using 2-4 swabs. Rub and roll the swabs on the gums and inside the cheeks so that the sample collected has thoroughly coated the surface of the swabs. The swabs should be air dried and packaged for submission to the laboratory. If FTA<sup>®</sup> paper collection is also desired, the wet/moist swabs should be blotted and rubbed on the FTA<sup>®</sup> paper before the swabs are dried. The FTA<sup>®</sup> paper should also be packaged for submission to the laboratory. The swabs and/or the FTA<sup>®</sup> paper must be labeled with the name of the person from whom it was collected, or some case identifier to link the item to the individual.
- A blood sample on FTA<sup>®</sup> paper\* may be collected. This type of sample is generally collected by medical staff using a finger lancet or blood draw. Liquid blood is blotted on the FTA<sup>®</sup> paper labeled with the name of the person from whom it was collected, or some case identifier to link the item to the individual. The FTA<sup>®</sup> paper should be packaged for submission to the laboratory. This method of collection is recommended for a victim of sexual assault, especially when an oral assault is alleged.
- Liquid blood presents a biohazard for laboratory staff and is not a recommended method for reference sample submission. If liquid blood submission is the only available option, blood samples should be drawn into lavender-top tubes. (Grey-top tubes are used by the Toxicology lab for alcohol and drug screening. In some cases, typically vehicular assaults and vehicular homicides, you may need to collect blood samples in both types of tubes for separate submission to the crime laboratory and the Toxicology laboratory.). Both the tubes and the packaging must be labeled with the name of the person from whom the blood was drawn.
- Blood may be collected at autopsy. It is recommended that liquid blood be blotted on FTA<sup>®</sup> paper\* for submission. If autopsy blood is not available or is in poor condition, other body tissues can be used for reference/known samples. The crime laboratory should be contacted for recommendations.

\*FTA<sup>®</sup> paper is recommended for long term storage of reference samples. Other types of absorbent paper are acceptable, but not recommended.

Elimination Database Samples

The WSP Crime Laboratory maintains an elimination database which includes DNA profiles from WSP Crime Lab staff, law enforcement agency personnel, and other individuals that enter laboratory facilities, to screen for potential contamination of evidence profiles. The WSP Crime Laboratory highly recommends submission of elimination samples from detectives, crime scene technicians, and forensic staff who regularly handle items of evidence submitted for DNA analysis. Agency personnel may contact their local WSP Crime Laboratory for more information or to submit a DNA elimination sample.

**RETURN OF ITEMS**

All DNA work product produced during sample analysis, including remaining DNA extracts from evidence (reference DNA extracts will be discarded), microscope slides, and sample cuttings or cellular material not subjected to DNA extraction, will be returned to the submitting law enforcement agency in a new, separate item. As part of the DNA work product, DNA extracts will be in a preserved format and can be stored at **room temperature** or lower.

The DNA Crime Laboratory Report will indicate the name of the new item in which DNA work product is returned.

If you have any questions, please call your local crime laboratory. Phone numbers can be found in the Introduction to the Guidebook (pages 8-10).

## 8.0 CODIS PROGRAM

### THE COMBINED DNA INDEX SYSTEM (CODIS) PROGRAM

The Washington State Patrol Combined DNA Index System (CODIS) is composed of different categories (or indexes) of samples, including:

- Offender: contains DNA profiles of Washington convicted offenders.
- Forensic: contains DNA profiles generated from crime scene evidence.
- Missing Persons: contains DNA records of missing persons and deduced missing persons.
- Relatives of Missing Persons: contains DNA records from the biological relatives of individuals reported missing.
- Unidentified Humans: contains DNA records from recovered living persons (e.g. children who can't and others who can't or refuse to identify themselves) and recovered dead persons (including body parts and tissues) whose identities are not known.

DNA casework analysts contribute the DNA profiles for all indexes except the Offender Index. If a DNA profile is generated from an evidence sample submitted to any of the DNA casework laboratories, it will be searched against the database if appropriate. The database searched (national- or state-level) will depend on the relevant NDIS Procedures and WSP CODIS Procedures in effect at the time the profile is initially entered. If the database eligibility requirements change after a profile is initially entered, profiles may be moved from one database to the other, or removed from the database entirely. If removal occurs, the submitting agency will be notified. Samples eligible for upload to the state CODIS database are automatically searched against the appropriate indexes and may result in an investigative lead for the submitting agency. Investigative leads may be due to a profile in the Forensic Index matching another Forensic Index profile (a forensic hit) or matching a profile in the Offender Index (an offender hit).

All fifty states, the District of Columbia, the U.S. Army Criminal Investigations Laboratory, and Puerto Rico submit eligible DNA profiles to the FBI-sponsored National DNA Index System (NDIS). DNA profiles at NDIS are searched on a regular basis against the appropriate indexes resulting in hits between WA State DNA profiles and profiles submitted by other NDIS participating laboratories across the nation. In addition to the indexes listed above, NDIS maintains additional indexes such as the Arrestee Index and Detainee Index which are populated by entities that have the legal authority to collect DNA samples from these individuals.

Offender DNA samples are collected by law enforcement agencies across the state using collection kits provided at no charge by the CODIS Laboratory. Washington State law allows for the collection of a DNA sample for any person convicted of a felony or any of the following non-felonies:

- Stalking
- Harassment
- Communicating with a minor for immoral purposes
- Assault 4 with sexual motivation
- Assault 4 where domestic violence was pleaded and proven
- Custodial sexual misconduct 2
- Patronizing a prostitute
- Sexual misconduct with a minor 2
- Indecent exposure
- Violation of a sexual assault protection order granted under chapter 7.90 RCW

- Anyone required to register as a sex or kidnapping offender
- Failure to register

Offender DNA samples should be submitted to the CODIS Laboratory located in Seattle. DNA samples submitted for the purposes of entry into the Offender Index are not considered evidence samples and do not take the place of a suspect reference sample. Offender DNA collection kits should not be used for the collection of DNA samples involved in criminal cases. If reference samples for a criminal case are submitted using these kits, they may be rejected by the laboratory.

DNA profiles generated for the Offender Index are processed by the forensic scientists of the CODIS Laboratory in Seattle. Profiles generated for this index are entered into CODIS and searched against other appropriate indexes. Eligible offender DNA samples are also submitted to NDIS.

## 9.0 MATERIALS ANALYSIS

### CHEMICAL ANALYSIS

The Washington State Patrol Materials Analysis Unit is responsible for the analysis of chemical compounds and mixtures, including, but not limited to, seized drugs, clandestine laboratory evidence, explosives evidence analysis, fire debris samples, general chemical unknowns, and a variety of other types of physical evidence in which chemical and instrumental examinations may be required. Because of the wide variability in the complexity and types of evidence submitted in these cases, a single approach or set of methods and procedures may not adequately address all types of chemical analysis casework. However, for most cases submitted, the procedures listed below are routinely employed by Crime Lab personnel. Non-routine cases may require the modification of listed procedures or research into the establishment of new procedures. Should this happen for a particular case, it will be described in the resulting Crime Lab report.

### SEIZED DRUGS

#### Precautions

- Do **not** submit any hypodermic needles, razor blades, or other sharps. Syringes will not be accepted. In rare circumstances, and only with documented prior approval by a Materials Analysis supervisor or designee, a syringe may be submitted. The crime laboratory will **not** accept any case under any circumstances that includes a needle alone, a syringe with the needle attached, or a syringe with the needle broken off or sheared.
  - *NOTE: Shearing or breaking of contaminated needles is prohibited. [29CFR1910.1030 and WAC296-823-14010] All syringes and needles are considered contaminated.*
- Many drugs are very potent, and even minute amounts present a health hazard. Do not taste or hold the suspect material close to the nose in order to smell it. Do not eat, drink, or smoke while handling the material.
- When threat-related mail is received, the first contact should be the FBI's Weapons of Mass Destruction coordinator. This individual has the responsibility for assessing the threat level and has a team of responders who can assess the nature of the threat, whether explosive, radiological or biological. The Crime Lab Division can analyze chemical and explosive materials and residues but is not equipped nor trained for radiological or biological material threats. Once the FBI has screened the evidence it may be submitted to the crime lab for chemical or explosives analysis, if appropriate, or to the Washington State Public Health Department Laboratory in Seattle for biological and radiological analysis. The FBI Office/Seattle Weapons of Mass Destruction coordinator can be reached at (206) 622-0460.
- To prevent risk from fire and/or explosion, do **not** submit any items containing batteries, such as electronic smoking devices, vape pens and scales. These items will not be accepted unless the battery has been removed prior to submission to the laboratory. If the batteries cannot be removed from a smoking or vaping device, the liquid reservoir should be removed and submitted separately. Please contact your local crime laboratory with any questions.
- Be sure to exercise good personal hygiene when handling suspected substances by washing the hands thoroughly using soap and water after handling, even if direct contact was not made. Hand

sanitizer is not effective in these situations. Use appropriate personal protective equipment (PPE).

- Small amounts of material must be handled with care to avoid contamination and loss.
- If green or wet plant material is stored in plastic or vapor tight packaging, biological degradation may prevent analysis of the sample. Dry thoroughly, if possible, and package in paper containers.

## Significance

Seized drugs analysis typically involves the qualitative examination of suspected drug evidence to determine if the material does in fact contain a controlled substance, and if so to identify that substance to the exclusion of all others.

Seized drugs are a major part of the crime laboratory caseload. They are physical evidence not only in illegal possession and sale cases, but also in such varied crimes as burglaries, traffic fatalities, and assaults. For efficiency and accuracy, it is imperative that the evidence be selected, packaged, and forwarded in a careful manner.

## *Plant Material*

### Marijuana (Genus Cannabis)

The most common plant material submitted for analysis is some form of marijuana. The definition of marijuana in the RCW states in part, “marijuana” or “marihuana” means all parts of the plant Cannabis, whether growing or not, with a THC concentration greater than 0.3 percent on a dry weight basis. The law further states “THC concentration” means percent of delta-9-tetrahydrocannabinol content per dry weight of a part of the plant Cannabis, or per volume or weight of marijuana product or the combined percent of delta-9 tetrahydrocannabinol and tetrahydrocannabinolic acid in any part of the plant *Cannabis* regardless of moisture content (total THC). International methodologies for determining THC concentration determine the total THC content and WSP CLD will also be reporting total THC (see below).

Plants of the genus cannabis can be thought of as two distinct varieties – those grown for their fiber content and those grown for their physiological properties. Plants grown for their fiber content are generally referred to as hemp while those grown for their physiological properties are referred to as marijuana in North America or herbal cannabis in Europe. Morphologically these plants are virtually indistinguishable from one another though the chemical composition of the plants allow for their distinction.

While eighty-five different cannabinoids have been identified in cannabis plants, it is primarily one compound, delta-9-tetrahydrocannabinol (THC), which has psychoactive properties. Tetrahydrocannabinolic acid (THCA) is the biosynthetic precursor to THC. THC levels in fresh plant material, regardless of variety, are quite low and the conversion of THCA to THC occurs during drying and with exposure to light and/or heat. Marijuana use by smoking or addition to baked products will also convert THCA to THC. Hemp plants contain a low concentration of THCA and therefore THC. To account for this conversion, the hemp industry has established legally acceptable levels for total THC that reflect the combination of THCA and THC (0.2 percent in Europe; 0.3 percent in Canada). Hemp industry standards require frequent testing to ensure compliance with these limits. The United Nations Office of Drugs and Crime (UNODC) and Health Canada have oversight of the testing methodologies to ensure compliance with the total THC limits in the European Union and Canada respectively. These

methods call for the quantitative analysis (determination of concentration) of total THC using gas chromatography.

Gas chromatography (GC) is an analytical technique used by WSP for quantitative analysis of total THC which exposes the sample to high temperatures resulting in the conversion of THCA to THC. High pressure liquid chromatography (HPLC) is another analytical technique which can be used to quantify THC. HPLC does not utilize high temperatures thereby reducing the likelihood of THCA conversion to THC.

The legal limit for recreational possession for any person twenty-one years of age or older without a medical marijuana authorization is:

- One ounce of useable (leaf) marijuana;
- Sixteen ounces of marijuana-infused product in solid form; or
- Seventy-two ounces of marijuana-infused product in liquid form.
- Seven grams of marijuana concentrate.

The legal delivery by a person twenty-one years of age or older to one or more persons twenty-one years of age or older, during a single twenty-four hour period for noncommercial purposes is:

- One-half ounce of useable marijuana;
- Eight ounces of marijuana-infused product in solid form
- Thirty-six ounces of marijuana-infused product in liquid form; or
- Three and one-half grams of marijuana concentrates.

The table below lists the types of marijuana cases the Crime Lab will accept for analysis:

Leaf Marijuana	Under the age of 21 All	21 and older Exceeding maximum amount allowed*
Marijuana Concentrates (hash oil, wax, shatter)	All	Exceeding maximum amount allowed*
Marijuana Infused Products in Solid form	Offenses on or after July 24, 2015	Vaping products exceeding maximum amount allowed. No other infused products analyzed.
Marijuana residues (smoking devices)	All	NONE
All manufacturing and delivery cases, except marijuana infused products in solid form cases		

\*Requires THC quantitation. Leaf marijuana and marijuana concentrate items for those under 21 with offense dates before July 24, 2015 also require THC quantitation.

Because of technical complexity and costs, the Crime Laboratory Division will only provide THC quantitation analysis for solid-form marijuana-infused products in vaping products. The Toxicology Division provides analysis for evidence submitted in liquid form. Effective July 24, 2015, infused product cases related to minors don't require THC quantitation. We will accept cases of marijuana-infused products in solid form involving those under the age of 21 and perform a **qualitative** analysis (no

determination of concentration) for offense dates on and after July 24, 2015. Please contact the Toxicology laboratory for marijuana-infused products in liquid form.

For all other suspected marijuana-infused product in solid form cases, please refer to outside laboratories approved by the Liquor and Cannabis Board (LCB). A list of these labs is located at the LCB website: <https://lcb.wa.gov/>.

NOTE: Shipping marijuana across state lines is prohibited, and no analytical labs can accept cases from out of state because marijuana is still a Schedule 1 controlled substance according to Federal statutes.

A six week minimum lead time is required for all marijuana cases requiring THC quantitation. A minimum of 0.5 gram of material must be submitted for THC quantitation. Hemp or non-flowering plants may require additional material and it is recommended a baseball sized amount of material be submitted for testing. Exhibits containing less than this amount will be analyzed to determine if THC is present but will not be quantitatively analyzed. Please keep your local crime laboratory informed of all rush court dates to facilitate the timely analysis of marijuana cases. Marijuana cases requiring THC quantitation may be forwarded from your local laboratory to another laboratory in the Crime Laboratory Division for analysis.

The Crime Laboratory Division will not provide analysis of marijuana or marijuana products related to Civil Infractions.

Measurements of the height and diameter of the plant to establish if a plant or clone is immature will not be conducted by the Crime Laboratory. These measurements need to be taken in the field before collecting and/ or packaging of the sample.

#### Other Plant Materials

Other plant materials include psilocybin mushrooms, opium poppies, khat, peyote and “Spice” (drug substances sprayed onto plant material).

#### *Solid Dosage Forms and Powders*

Solid dosage forms of evidence include pills, powders, tablets, chunky material, tar-like substances and blotter paper. Drug paraphernalia includes pipes, measuring scales, balances, sifters, bowls, spoons, and a variety of other objects used, or intended to be used, with seized drugs.

#### *Liquid Samples*

Liquid samples include contents transferred from syringes, injectable solutions and steroids, some precursor materials, and other controlled substances.

### **Collection and Packaging**

Make sure each item is contained within appropriate packaging before sealing in the final evidence envelope or container. Do not put loose powder, tablets, or any other small or breakable objects directly into the final evidence envelope. This packaging should include the case number, item number, officer's

initials, and date. Make sure the outer envelope or package containing the item(s) is sealed and labeled properly.

Suspected **fentanyl** should be packaged to prevent exposure due to accidental breach of the packaging material (such as in a paint can or other hard sided container). Evidence confirmed to contain fentanyl will be returned to the submitting agency clearly labeled as containing fentanyl and may be repackaged for safety.

Liquids should be stored in vials or bottles with secure, non-leaking lids. Glass vials with Teflon sealed caps are recommended. Plastic flip-top vials are good for small quantities. Vials and bottles should be packaged to prevent breaking. As with all other types of evidence, the items should be sealed and labeled properly.

### *Plant Material*

- Suspected khat (which contains cathinone and/or cathine) should be frozen immediately and delivered to the laboratory in a manner that minimizes thawing. Call the laboratory if you have any questions.
- For marijuana and other plant material, completely dry the plant material at room temperature. Fans should be considered if air circulation is poor. When vegetable material is dried thoroughly, place in a paper sack, box, or paper envelope. Avoid loose mesh bags as contents (plant particles and fragments, dirt, etc.) may sift through the mesh holes. Do not place the dried plant material in a plastic container or a plastic-coated container. If not dried and packaged properly, the material may degrade and interfere with or prevent any analysis. Please do not submit wet plant material.
- If a large amount of plant material is confiscated, it is not necessary to send all of it to the crime laboratory. A representative sample of the plant material should be selected and dried, if necessary, and sent to the crime laboratory. Careful notes should be taken as to the total amount (weight) of material confiscated and the amount and locations of the sampling. Contact the crime laboratory for assistance if there is a question as to how to take a representative sample or the amount of the sample to be collected.

### *Field Tests*

- Drug field test kits are **presumptive** tests (i.e., a positive result indicates a possibility that the substance being tested for is present). They are **not** conclusive tests which prove the presence or absence of a particular drug. These kits are useful in establishing probable cause and enabling the investigating officer to obtain a search warrant or an arrest warrant. Some field tests have been shown to give false positive results, indicating the presence of one type of drug when in fact another type is actually present.
- If the amount of suspected material is very small, a field test may consume too much of the sample and prevent further testing by the crime laboratory. In such cases, it is best not to perform a field test, but to send the material to the crime laboratory for analysis.
- **Do not** send the used drug field test kit to the crime laboratory—the reagents are corrosive and likely to spill during shipping; the resultant colors fade and are not recognizable. The crime laboratory will carry out a full analysis and report on their findings for your evidence. Used field test kits received with evidence will be disposed of by the crime laboratory in a safe manner.

### *Procedures for Drug Evidence Retrieved from Body Cavities*

Drug evidence recovered from anal, vaginal, and oral cavities presents a serious health hazard to both law enforcement and crime laboratory personnel. To keep these personnel from being placed in jeopardy, the Crime Laboratory Division has instituted procedures affecting law enforcement personnel for dealing with this type of evidence.

Seized drug evidence removed from a body cavity is usually packaged in some type of protective material, such as a balloon, condom, or plastic bag. Certain steps need to be taken to decontaminate the outside of this container, both to protect personnel from biohazards and to eliminate malodorous decomposing bodily substances.

The following procedures must be used for decontaminating evidence before packaging as described above:

- Place the evidence (in its protective material) in a container of fresh bleach solution (1 part household bleach and 10 parts water) and soak for at least 15 minutes. Rinse thoroughly with running water. Dry carefully with a paper towel. Place in a clean container and label the container "From Body Cavity" and "Soaked in Bleach Solution." The cleaned container may be submitted to the crime laboratory for examination of the contents. The clean container will not require a biohazard label.
- If you have reason to believe that the wrapped evidence may leak and be attacked by the bleach solution, do not use the above method. If possible, transfer the suspected controlled substance to an appropriate biohazard labeled container before shipping, or call the crime laboratory for an alternate procedure.
- Be sure to note on the laboratory request form AND on the evidence packaging that (1) the item of evidence was removed from, or suspected of being from, a body cavity, and (2) that it was adequately soaked in bleach solution, as applicable.

The clean container will be safe for handling by law enforcement personnel who must come into contact with, transport, and store the evidence. Disposable gloves and other personal protective equipment should be used while handling the contaminated container. Do not contaminate the outside of the clean container.

Seized drug cases involving evidence found to be removed from a body cavity and not properly processed before being submitted will be returned to the law enforcement agency without further examination.

If there is any difficulty or question regarding the above procedure, contact the crime laboratory before processing with the bleach solution.

## Submission

- Use the [Request for Laboratory Examination](#) form (3000-210-005).
- Make sure to list the items in order of priority (i.e., the order in which you want the items to be examined). Specifying the probable cause item is recommended.
- Write the item numbers clearly.
- Do not list substances as a particular drug. Instead, list substances as "suspected cocaine" or "suspected of containing heroin."
- The Crime Laboratory will report measurement uncertainty for weights associated with marijuana statutory limits. If measurement uncertainty is required for the weight of other substances, this must be noted on the request for laboratory examination.
- Describe any special precautions to be taken, such as suspected to contain fentanyl/fentanyl analog, biohazards or future latent print examination.

- **Disposal of Seized drugs:** The crime laboratory does not destroy or dispose of any seized drugs or any other submitted evidence, even if it is determined not to contain a controlled substance. All submitted evidence—except that which was consumed in the analysis and used field test kits received—will be returned to the submitting agency.

## CLANDESTINE LABORATORY ANALYSIS

Clandestine (clan) lab case samples may contain a variety of liquids, solids, pure reagents, reaction mixtures, extracts and waste chemicals. Samples will normally be collected at the scene in duplicate to ensure that sufficient samples are available for reanalysis if required; therefore, only one sample vial set needs to be submitted to the Crime Lab for examination.

Generally, the first step in the analytical process is the identification of relevant chemicals in a sample. In general, a successful chemical identification strategy will utilize two or more techniques which lead to the same conclusion and preclude a false positive identification. The analysis of clandestine laboratory evidence utilizes a variety of instrumentation, including but not limited to, GC, GC-MS, FTIR, Raman, CE, X-Ray Fluorescence (XRF), and Scanning Electron Microcopy/Electron Dispersive X-ray Detection (SEM/EDX). Additionally, non-instrumental tests such as flame tests, color and precipitation tests, and microcrystal tests will also aid a forensic scientist in the identification and characterization of clandestine lab evidence.

### **Precautions**

- List of DO NOTs

As soon as there are good reasons to believe a clandestine laboratory exists, the investigator must not enter the premises. If you have already entered, vacate the area immediately. Do not smoke. Do not turn any electrical switches on or off; leave them as they are. Do not shut off any running water. Do not pour any water on any equipment or material—some chemicals will burst into flame or explode when in contact with water. If equipment is operating or "cooking," leave it as is. Many of the chemicals involved are toxic, flammable, and even explosive. Because a suspected clandestine laboratory potentially contains many chemical and physical hazards, these sites are treated as hazardous material incidents and the safety rules governing their processing will apply. These rules are dictated by OSHA, WISHA and Washington State Department of Labor and Industries. Only those personnel who are trained and qualified to use personal safety equipment (hazardous material protective clothing, SCBAs and respirators) are permitted to work in this kind of environment.

- Call In Help

There are several well-trained teams throughout the state that have the expertise, equipment and necessary certifications to handle and process clandestine laboratories.

- Contact the **WSP Clandestine Lab Team**

The WSP Crime Lab has a team of chemists that are available to provide on-scene advice related to the clandestine manufacture of illicit substances. The chemists are available to provide advice related to safety, what samples to collect, type of process occurring, etc. The chemists are *not*

available to collect and package evidence or to conduct a hazmat response within a scene.

If advice of a chemist is all that is needed, call the Crime Scene Response Team (CSRT) coordinator at (253) 255-3064 and request the assistance of a chemist.

If a full clan lab response by a qualified team is needed, contact WSP-SWAT.

WSP-SWAT consists of specially trained investigators who have the proper safety gear and equipment to enter and investigate a clandestine drug laboratory. While waiting for SWAT to arrive:

- Secure the surrounding area.
- Do not allow anyone to enter.
- Follow any instructions that the Team may provide.
- Treat the clandestine laboratory and surroundings as a crime scene.
- Any physical evidence—such as tire or foot impressions, fingerprints, records, and vehicles—must be protected for later evaluation and collection.

## Significance

The objective in analyzing evidence from suspected clandestine laboratories is to determine if controlled substances had been, are being, or could be manufactured, the synthetic route utilized, and the production capacity. Evidence from a clandestine drug laboratory may include controlled substances, precursors, chemical reagents, solvents, by-products, and chemical waste.

The most common seized drug manufactured in clandestine laboratories in Washington is methamphetamine. However, clandestine laboratories involved in the production of other controlled substances including, but not limited to, 3,4 - methylenedioxymethamphetamine (MDMA), methcathinone, lysergic acid diethylamide (LSD), phencyclidine (PCP), phenethylamines, tryptamines, and other seized drug analogs, may be encountered.

## Collection and Packaging

The collection of evidence at a clandestine laboratory focuses on documenting the chemical reagents and chemical hardware present. Samples need to be collected from reagents, reaction mixtures, and possibly wastes and residues for later analysis. An inventory of all laboratory related materials should be submitted to the crime laboratory along with the samples. This will enable the chemist to evaluate the method of manufacture used and potential production capacities.

Representative samples of materials at a scene should be collected by a qualified team. For safety and ease of storage, collected samples should not exceed a few grams or about 20 milliliters (sugar packet = 1 gram, and ½ shot glass = 22 milliliters). The only items that should be collected in their entirety are suspected finished product or other seized drugs. Actual weights or volumes of the materials being sampled should be recorded. Estimates based on container size (such as “a one quart jar, half full”) are acceptable. Residues in filter papers may be collected by taking the entire filter paper or a representative number if there are several. All samples should be clearly labeled with item numbers.

Factory sealed reagents do not need sampling but should be photo documented and included in the inventory. All samples should be collected in duplicate and over-packed in separate metal cans with an absorbent material (such as kitty litter) for storage and preservation. One of the sample cans is submitted

to the WSP Crime Laboratory and the other is stored by the submitting agency. Identification of what needs to be sampled is often difficult and best left to an experienced chemist if available.

Training in clandestine lab sampling may be provided to detectives who have taken an appropriate safety course. If you are unsure of how to handle any materials encountered in a clandestine lab, it is important to contact the crime laboratory and speak to a chemist.

### *Special Note on Handling Anhydrous Ammonia*

RCW 69.50.440 relates to the possession of anhydrous ammonia for the intent of manufacturing methamphetamine. It is common practice for illicit drug manufacturers to take propane tanks and fill them with anhydrous ammonia. This compound is then used in the production of methamphetamine. Common propane tanks were never intended to store anhydrous ammonia. The fittings around the nozzle of the tanks are readily corroded by this compound, causing potential leakage of ammonia gas.

Proper training and safety equipment are needed to handle and test these tanks. **TANKS IN THIS CONDITION ARE A SERIOUS POTENTIAL HEALTH HAZARD – DO NOT SUBMIT THEM TO THE CRIME LABORATORY FOR ANALYSIS.** Contact your local Crime Laboratory or WSP-SWAT for information on preliminary testing and documentation. Disposal information can be obtained from the Department of Ecology (1-800-258-5990).

## POISONS/TOXINS, SOLVENTS, INHALANTS, AND GENERAL UNKNOWNNS

Wide varieties of substances are of interest in criminal investigations and may be submitted to the crime laboratory system for analysis and identification. Materials that may be submitted can include unknown substances, which may be solids, single, or multi-phased liquids, organic or inorganic material, or any of a myriad of items. The request may be to identify an unknown material, identify a component in an altered material, to confirm the adulteration of one material by another or to compare two samples of evidential material which have not previously been compared.

The Crime Laboratory Division is not properly equipped to analyze many types of poison/toxin type cases. The Division lacks appropriate technology and/or methods of analysis, personnel expertise, safe facilities and sufficient training for the wide variety of potential toxins, poisons, biotoxins, neurotoxins, and other possible contaminants. Furthermore, these substances may endanger Crime Laboratory staff when accepted into the laboratory. **PLEASE CONTACT THE CRIME LAB BEFORE SUBMITTING THIS TYPE OF CASE.**

### **Precautions**

Evidence from these cases may contain unknown materials that may present flammable, contact, and/or inhalation hazards in addition to any toxic effects. Acids and bases, which are very corrosive, may be encountered as evidence. Eye and skin protection must be used when handling these types of materials.

Tear gas products are irritants, by definition, and will cause physical discomfort if inhaled or exposed to the eyes.

### **Significance**

The finding of the scientist's examination may give some possible results which include:

- Identification of an unknown material.
- Identification of the chemical components of a sample.
- Determination that there is no evidence of a suspected contaminant.
- Inconclusive results from which no conclusion can be drawn.

At times, it may be possible to develop a list of possible sources or uses of the identified components. Though identification may not be achieved, useful or investigative information will be included in the report whenever possible.

### **Collection and Packaging**

Samples must be packaged appropriately to preserve the sample and reduce exposure to personnel handling evidence. Packaging should be selected which will not degrade due to the nature of the sample (i.e., acids will react with metal containers and may form harmful chemicals).

Food items should be frozen, or at a minimum refrigerated, to reduce decomposition of the sample. Generally these items need to be submitted as soon as possible to the crime laboratory for analysis.

Many of the collection and packaging techniques listed for fire debris evidence can also be utilized for solvents, inhalants and general unknowns. It is especially important that any evidence suspected to be volatile in nature be packaged in vapor resistant packaging such as paint cans, polyester bags or nylon bags that are properly sealed. Contact your local crime laboratory if there are any questions concerning the packaging of this type of evidence.

## **Submission**

When cases are received with *specific suspected contaminants* suggested by the agency, Supervisors or Laboratory Managers will have the authority and flexibility to accept such cases if Crime Lab personnel have demonstrated experience and accepted methods for conducting such analyses. Agencies should contact their local Crime Laboratory with any questions prior to submitting such items. It may be necessary to refer the agency to another laboratory more fully capable of handling these analyses.

## FIRE DEBRIS

### Introduction

The primary role of the crime laboratory is to identify ignitable liquids or residues.

### Precautions

- Contact the crime laboratory if there are any questions concerning the procedures for collecting and packaging fire debris evidence.
- Any liquid found may be ignitable; remember to handle with care.
- The analysis for ignitable liquids must not be delayed, since they may be lost through evaporation, weathering, or bacteriological degradation.
- Evidence suspected of containing traces of ignitable liquids must be packaged in vapor tight containers.
- Each container must be properly labeled and sealed. The containers must be sealed with tape extending across the top of the container and down the sides. The tape must be initialed so that the initials are across the tape onto the container.
- Do not place gloves used for collecting and packaging evidence in the evidence container.
- If possible, evidence containers should be stored in the freezer, or refrigerator if freezing is not possible, prior to submission to the crime lab. Submission of the evidence to the crime lab should be done promptly.

### Significance

Laboratory examination of the evidence may reveal:

- The presence and nature of an ignitable liquid which may have been used to accelerate the fire.
- The manner and area where the fire was set.
- The potential connection of a suspect with the arson scene through comparison of trace evidence and latent prints, or identification of similar classes of ignitable liquids.
- The presence of another crime which the fire was planned to conceal, such as a homicide or fraud.

### Collection

#### *Ignitable liquid residues (fire debris)*

- Locations: protected areas (under furniture, floor moldings and joists, in cracks); lower surfaces, since liquids flow downhill; porous materials (carpet and padding, wood); soil, unsealed concrete, flooring and sub-flooring.
- Use of a vapor detector ("sniffer") or ignitable liquid trained K-9 may be helpful. Many ignitable liquids do not have a noticeable odor. Other solvents may be masked by the odor of burnt materials. The human nose loses its sensitivity to certain odors when exposed to large quantities of scents for an extended period of time.
- Methods: cut cross-section through and below suspect area or pour pattern, if possible. **Do not** use a gas-powered saw tool or generator near the sample area because contamination of the sample may occur. Sampling substrates which cannot be cut or removed may be accomplished with the use of unscented non-clumping kitty litter. Contact your local crime laboratory for guidance with this process.

- Comparison Sample: a sample of the same substrate materials as the samples collected from the origin of the fire, but from an adjacent area without the suspected accelerant.
- Sample collection amount: Do not fill sample container more than 2/3 full as the empty space is needed by the laboratory for vapor sampling.

#### *Ignitable liquids*

- Locations: cans, bottles, porous materials, surface of puddles.
- Methods: pipette, pour, or siphon into proper container; blot or skim surfaces with paper towel or gauze.
- Labeling: Label the secured container properly and label as “fragile”.

#### *Molotov cocktails*

- Package ignitable liquid and wick separately from the bottle, jar, or glass fragments. If there is no visible liquid, the wick remains are more likely to contain residue than the glass.
- If fingerprint examination is desired, the glass should be stored so it can dry out rapidly. Fingerprints are dissolved by ignitable liquids. Preservation of this evidence for fingerprints may prevent ignitable liquid analysis.
- If there is insufficient liquid, seal the glass in a vapor-tight container. Separate the larger pieces, which are most likely to contain latent prints, for drying and fingerprint processing. If there is not enough glass to process for both prints and for liquid analysis, a decision must be made as to which of the analyses will be most beneficial to the case.
- Label containers as fragile or as containing fragile material.

#### *Burned, charred paper (for document examination)*

- Before proceeding, call the Forensic Questioned Documents Section at the Spokane Lab at (509) 625-5401 for instructions.
- Handle as little as possible. Leave charred paper where found if in a box, drawer, or wastebasket.
- If repackaging of charred paper is necessary, place them loosely in a rigid container lined with cotton. Use gloves so as not to leave your own fingerprints.
- Hand-carry. **Do not mail.**
- If an analysis for volatiles is desired, seal papers in a vapor-tight container. If other examinations are desired, call the crime laboratory immediately for instructions.
- Label all containers as fragile.

#### *Soil samples*

- Freeze all soil samples after collection. Refrigerate if unable to freeze. Bacteria in the soil can destroy petroleum-based products; low temperatures will retard bacterial action.

#### *Clothing and cloth*

- Gloves, shoes, and pants are the most likely to have ignitable liquid stains and spills. If possible, retain all of the suspect's outer clothing.
- Package in the same manner as ignitable liquid evidence. **Do not fill the entire can with the garment;** cut the garment into pieces, if necessary. Leave at least 1/3 of the can empty for vapor sampling by the laboratory.
- Clothing removed from a body needs to be frozen after packaging in a vapor-tight container.
- Shoes are often too long to fit easily into a gallon-size can without significantly bending and/or distorting the sole. It is not known whether or not this will alter the individualizing

characteristics of the shoe outsole. To avoid this possibility, seal shoes in a polyester or nylon fire debris bag.

### *Solid accelerants*

- Package in plastic or paper bags, metal cans, or if sharp or jagged edges are present, package in a rigid container that will not be punctured or torn. If the solid accelerants are found with petroleum products, call the crime laboratory for handling and packaging instructions.

### *Controls/Comparisons*

- A sample of material from the fire scene which is identical to the evidence submitted but does **not** contain any ignitable liquid is necessary. This sample, called a **comparison sample**, is collected from an area adjacent to the area where the evidence is collected and must be uncontaminated by the suspect ignitable liquid.
- **Control samples** are samples of known composition that are analyzed alongside test samples in order to evaluate influences from the sample matrix or packaging/collection material. Examples include an unused piece of gauze consistent with gauze used to mop up a suspected ignitable liquid or an unused paint can consistent with the cans used for evidence storage.
- Locations: From a protected area in the same room as the fire origin, from the room next to the fire origin, or from outside of a clearly defined pour pattern.
- Precautions: A comparison sample is easily contaminated by walking through a pour pattern and then through the control area; by water run-off; by condensation of a volatile substance which evaporated from another area of the scene; by using contaminated gloves, tool, or utensils to collect the comparison sample. It is difficult, if not impossible, for the investigator to always collect an uncontaminated comparison sample. To help avoid contamination, collect the comparison sample first, then the suspect sample.

## **Packaging**

It is important that the correct container is used to package the evidence. It is best to keep a variety of containers in several sizes on hand. Ignitable liquid residue evidence should not be stored in plastic containers or containers with plastic lids. Nylon and some polyester bags are an exception when properly sealed and have been shown to be free of contamination. Products designed for packaging volatile evidence may be purchased from many evidence packaging supply companies. For additional information on packaging materials for volatile evidence, contact your local Crime Laboratory.

Screw-top glass vials with Teflon-lined caps should be used to hold liquids of larger quantities (more than a milliliter) and should be packaged so they remain upright. Kitty litter or other absorbent medium may be used to hold vials upright and absorb leaks.

Clean, paint-type, unused, metal cans are preferable for storing liquid residues. Paint cans should be filled between 1/3 and 2/3 full. Never fill the can completely as this requires the sample to be repackaged before vapor sampling by the laboratory.

- **Advantages:** Cans are easily obtained, inexpensive, unbreakable, available in various sizes, and almost always maintain an airtight seal. Lined cans may delay or reduce the development of rust on the can.

- **Disadvantages:** Cans may rust through, rather rapidly on occasion, and must be checked frequently. They are bulky and do not nest. Once sealed, the evidence cannot be readily inspected.
- Use a hammer or rubber mallet to tap around the circumference of the lid for a proper seal. Keep debris out of the sealing groove. Inspect the seal to make sure the lid is completely seated.
- Several local manufacturers sell these cans.
- An empty control can may be submitted as an evidence item to demonstrate the cans are free from contaminants.

Polyester bags and nylon bags designed specifically for fire debris evidence (and other kinds of volatile evidence) are acceptable. Polyester bags must be heat-sealed. Nylon bags can either be heat-sealed or rolled three times and taped. When rolling and taping nylon bags, the tape must extend the length of the roll and wrap around to the other side of the package on both sides.

- **Advantages:** Bags are relatively inexpensive, easy to store, available in a variety of sizes, and are particularly useful for large bulky items. Evidence is readily visible.
- **Disadvantages:** Bags can be punctured by sharp objects from the interior and/or exterior during handling. Polyester bags require a heat-sealer (and source of electricity), and can be awkward at a scene.
- Polyester and nylon bags require special care to seal properly. The seal should be inspected closely to make sure it is complete and vapor tight.
- Properly sealed cans may be placed inside these bags if can rusting is a concern. Alternately, properly sealed polyester or nylon bags can be placed in metal cans to protect the bags.
- When a batch of polyester or nylon bags is ordered, it is a good idea to send the crime laboratory an empty control bag for examination to make sure the bags as manufactured are free from anything that might interfere with detection of ignitable liquid residues in samples.

Glass jars are not recommended.

- Jars are breakable, difficult to store, and may not provide a good seal.

Plastic resealable (ziplock) bags and garbage bags are not vapor tight and may contain contaminants. These types of bags are not appropriate for packaging volatile evidence.

## EXPLOSIVES

### Explosives Safety Checklist

The Crime Laboratories in Seattle, Tacoma, Spokane, and Marysville can conduct analyses of explosive evidence including post-blast debris, explosive material (see next paragraph), components of explosive devices, and deactivated explosive devices. Each of these types of evidence can provide information about how a device was made (or could have been made) and can also provide links to individuals of interest to an investigation. The manner in which this evidence is collected, packaged, and submitted to the laboratory is one of the most important factors that will determine how much information the laboratory can provide about the evidence.

## Precautions

Laboratory personnel will not accept unexploded (intact) explosive devices, or large quantities (greater than 1 teaspoon) of explosives. If evidence is suspected of containing an intact explosive device, the submitting agency **must** contact the crime lab for instructions on submitting the evidence (See also under Collection and Packaging of Explosives Evidence below).

## Significance

Unexploded devices, and the individual components of a device, will often provide the best evidence to link an individual to a bombing attempt. Fingerprints will often be intact, tape and glue will not have burned away, wiring and fusing will be undisturbed. In such cases, chemical analysis along with trace examination and fingerprinting or DNA analysis can provide a more complete picture of the device, and there is a much greater chance of connecting the device to an individual. Device reconstruction is beyond the scope of the services provided by the Crime Laboratory.

- **Bulk Explosives:** Bulk explosives may be single chemical compounds or they may be mixtures of substances that together are explosive. Explosives can be commercial or military products, or they may be homemade mixtures. Crime laboratory analysis of bulk explosives can identify the components of an explosive, and in some cases, provide information about the possible source of the explosive. In some cases, distinguishing characteristics of an explosive sample can be linked to explosives or individual chemicals in a suspect's possession.
- **Post-Blast Debris:** Debris from an explosion may be burned, buried in rubble, and/or scattered over a wide area. Pieces of an explosive device may be thrown very far from the site of an explosion. An extensive search of the surroundings and painstaking sifting through rubble may be required to obtain important evidence. This evidence may include fragments of the explosive device itself (e.g., pipe fragments, blasting caps, electrical components) or chemical residues deposited on objects near the explosion. Crime laboratory analysis can often determine what explosive material was used in the device, and in some instances, may help develop additional investigative information.
- **Components of Explosive Devices and Deactivated Devices:** Components of explosive devices may include tape, glue, containers, pipes, fuses, wires, blasting caps, clothespins, clocks, remote controls, etc.

## Collection

**Do not submit active devices to the laboratory.** Active devices, including blasting caps, should be dismantled, deactivated, or discharged in some way before submission to the laboratory. Call your local bomb squad or the Washington State Patrol Bomb Unit to deactivate the device. Make note of what method was used to deactivate the device (e.g., water cannon, blown up with dynamite, etc.), and provide this information documented on the [Explosives Safety and Evidence Checklist](#) when submitting the evidence.

## Packaging

Items with sharp or jagged edges should not be packaged in paper envelopes. Use sturdier containers such as clean metal paint cans.

Many explosives, particularly "high" explosives, contain components that are volatile and will evaporate over time. If it is suspected that high explosives (e.g. dynamite, nitroglycerin, C4, etc.) may be present, evidence should be packaged in a vapor-tight container. Clean metal paint cans or vapor-tight plastic bags (such as polyester or nylon bags) are suitable to preserve volatile evidence.

Submit only small amounts of bulk explosives. Be sure to include representative samples of the bulk material, especially if there are indications of mixtures. Typically a teaspoon of material is sufficient for laboratory analysis of bulk explosives.

Flash powder can be very sensitive and may ignite with a spark. If possible, package flash powder in anti-static plastic bags, made for use with static-sensitive computer components; or use paper packages, making sure to completely seal all openings and seams – flash powder is a very fine powder and will seep out of very small openings. Do not package bulk flash powder in metal containers or plastic bags not designed to be static-resistant. Submit only small amounts of flash powder. Typically a teaspoon of material is sufficient for laboratory analysis.

Whenever possible, submit control samples in a separate package along with the evidence. For example, if soil from a blast site is submitted, also collect a sample of similar soil from an area away from the seat of the blast. If a portion of rubber molding with blast residues is submitted, also submit a clean area of the molding. Package controls in the same manner as samples with residues – the manner in which a piece of material is packaged can affect the analysis (e.g., bacterial action in soil over time – See the trace materials packaging procedures.).

Porous materials or objects with cracks and ridges tend to collect a large amount of useful residues. Materials from near the blast site such as foam, rubber, pipe threads, cardboard, or any rough-surfaced items will often be useful items to collect.

If fingerprint analysis is desired, submit the items to the Materials Analysis section of the crime laboratory first. Indicate clearly that a fingerprint examination is needed. The crime laboratory can usually forward evidence to the latent prints section after the explosives analysis is finished.

Give the laboratory as much information as possible about the circumstances of the case. If evidence is from a blast scene, send pictures, diagrams, witness statements, officer's reports, etc. If a suspect has been interviewed or a premise searched, send information about what the suspect may have been involved with, including internet recipes, jars of chemicals recovered, statements from the suspect about what kind of device he was making, etc. The more information the laboratory has about the circumstances of a case or the source of a particular item of evidence, the better able the crime laboratory will be to help investigate an incident.

The person who collects explosives evidence must be free of contamination that might interfere with the investigation. If the individual collecting evidence has been involved with explosives recently, they should wear clean clothing including footwear. Hands should be washed and gloves should be worn. If very small amounts of explosives residues are involved, alcohol swabs and water swabs (with controls) should be taken of the evidence collector's hands and shoes, before any evidence is collected. Submit these swabs along with the evidence.

For larger scale incidents, assistance may be required from an agency with more resources at its disposal than any local agency or the state crime laboratories. For scenes beyond the capabilities of local responders or the laboratory, it may be necessary to contact your local BATF or FBI office. The BATF

and FBI can provide scene response, investigative assistance, and laboratory services in cooperation with local agencies and the state crime laboratories. When in doubt, call the state crime laboratory, and a BATF or FBI field office.

## **Submission**

In order to assure the safety of WSP CLD personnel and to be in compliance with applicable Federal Regulations, all potential unexploded explosives evidence must be delivered in person to one of the four CLD laboratories that perform explosives analysis. The Spokane, Marysville, Seattle, and Tacoma laboratories are the labs currently performing explosives examinations. Also, with any submission of explosives type evidence, complete and submit the [Explosive Safety and Evidence Checklist](#) along with the evidence and the Request for Laboratory Examination.

If any questions arise about evidence collection, packaging, submission, or about what services the laboratory can provide, call the state crime lab for assistance and advice.

## IMPRESSION EVIDENCE

In the process of entering and leaving a crime scene, shoeprints, footprints, and tire tracks and impressions can be left behind. Crime scenes should carefully and thoroughly be searched for such evidence and precautions taken to preserve it for documentation and collection. Sometimes overlooked as evidence, fabric impressions may be found in high impact “hit and run” incidents. Impressions of weapons or other objects may sometimes be found in assault or homicide crime scenes.

Impressions examinations typically include a questioned evidence impression being compared with a known item (shoe, tire, fabric, etc.) for comparison as a possible source. Sometimes there is only a questioned impression and the source must be determined. In these cases, impressions are also useful for investigative leads. Shoeprint Image Capture and Retrieval Database (SICAR ) is a footwear database which contains manufacturer information including outsole patterns to aid in identifying potential make and/or model of footwear impressions recovered from scenes of a crime. Even partial outsole impressions with only a few design elements, shapes, or logo portions can offer enough information to provide a possible shoe make and model. Because recognition of the design is the key, rather than comparison of fine detail, even images of an impression that were taken at an angle are valuable and should be submitted. Tire impression tread designs may also be searched for potential manufacturer make and model in tire tread design guides, although the search is not computer-assisted as with SICAR.

Latent fingerprints and palm prints are examined by the Latent Prints Laboratory and discussed in the [Latent Prints Section](#) of this document.

Tool mark impressions are examined in the Firearms section and are discussed in the [Tool Mark](#) section of this document.

Forensic odontology is not performed in the Washington State Patrol Crime Laboratory System.

### Precautions

Care should be taken to preserve any trace evidence such as hairs, fibers, or paint in the impression.

### Significance

Examination of impression evidence may reveal:

- The type of footwear or object that created the impression.
- Possible number of footwear and/or objects present
- If an impression was created by a specific shoe, tire, or other object.
- The approximate size of the object creating the impression.
- Manufacturing information about the shoes, tires, or other objects creating the impression.
- Order of deposition and possible movements/direction of travel.

### Collection

For all impression evidence, care should be taken to preserve trace evidence before any attempt is made to collect the impression.

#### Photography

**ALL** impressions should be photographed first before using any other collection method. Keep in mind the following points:

- **Scale/Ruler** - Take photos with and without a scale/ruler. The scale must be in the same plane as the impression so that both are in focus simultaneously. It might be necessary to dig a trench next to the impression to be able to place the scale in the same plane as the impression.
- **Camera Quality** - Use a digital camera with high pixel resolution. Take both RAW and JPG format if possible. If not possible, take in RAW only. Phone cameras typically are too poor of a quality for use in comparisons. If using a film camera, be sure to use low speed film. High quality images (in RAW format) are required for comparisons. Lower quality images may be used for SICAR searches (RAW or JPG).
- **Camera Position** - Position the camera as close as possible to the impression (fill the frame with the impression). Use a tripod to hold the camera steady. Place the camera directly over (i.e. aimed directly at, straight onto, parallel to) the impression, not at an angle to the side so that the entire impression is clearly in focus and no size or focus distortions result.
- **Lighting** - Use oblique lighting which highlights the impression detail. Take several photographs moving the light source between frames to various positions around the sides of the impression. For dust impressions, the light should be low and grazing the surface. For three dimensional impressions, or deep impressions, use a detachable flash held at a 45° angle approximately three feet away from the impression. Take at least three photographs of the impression repositioning the flash around the sides of the impression.
  1. For deeper three-dimensional impressions, take three additional photographs with the detachable flash at approximately a 65° angle in three positions around the sides of the impression.
  2. For shallow three dimensional impressions, take three additional photographs with the detachable flash at approximately a 25° angle in three positions around the sides of the impression.
- **Enhancement** - Some impressions may be latent in part or whole and need to be chemically enhanced before correct documentation and collection is possible. If a latent impression is suspected, protect the impression area and contact the crime laboratory for instructions. Disturbing the area around the partial impression by placing scales or markers may alter detail that could be revealed upon enhancement.
- **Tire Impressions** - For long continuous tire impressions, place a steel tape measure along the length of the impression.
  1. Take overlapping photographs along the impression for at least eight feet (approximately the full circumference of most tires). Overlap the photographs by approximately 2 inches.
  2. With the long tape measure still in place, move a second small scale and tape measure along the length of the impression while photographing to ensure accuracy in sizing. The small scale should be on the same plane as the impression.
- **Shoe Impressions** - When an entire footwear impression is present, photograph the full footwear impression. Then photograph sections of the impression, toe area and heel area, to achieve maximum resolution.

#### Intact Object

Take photographs before removing the object. Whenever possible, the entire object which has the impression and/or has created the impression should be submitted to the laboratory. Positive identification of the source of the evidence is more likely when the original impression can be examined. The evidence has to be packaged in a manner which protects the impression from contact with any other surface (including the packaging, if the impression is fragile). Securing a small, open cardboard box over an impression can often keep the packaging from disturbing an impression.

### Lifting

Take photographs before lifting the impressions.

- Dry-Deposit Impressions - In general, dry-deposit impressions (e.g. dust impressions) may be lifted with fingerprint tape, a trace evidence lifter, a gel lifter, or an electrostatic dust lifter. Do not dust a dry-deposit impression with fingerprint powder as the impression will be lost.
- Wet-Deposit Impressions – In general, wet-deposit impressions that stick to a substrate (e.g. dried mud impressions, tracks on a floor from a wet athletic shoe), may be lifted with a gel lifter or may be lightly dusted with fingerprint powder prior to being lifted with a gel lifter.
- Gel Lifts – Do not press gel lifters too firmly, or the impression will be distorted. Consider a black gel lifter if the impression is made with light colored particles, or a white gel lifter if the impression is made with dark colored particles.
- Importance of Lifts – Although impression evidence examinations can be done using only photographs (correctly taken), lifts or casts should also be taken. The important individualizing characteristics required to identify the source of an impression may not be visualized in a photograph. Contact the crime laboratory for assistance if you have questions.

### Casting

Take photographs before casting the impression. Impressions in soil should be cast with dental stone (plaster should be avoided as it gives less detail and forms a softer cast). Impressions in snow and under water require special handling, and the crime laboratory should be contacted for instructions when these types of impressions are encountered. Although impression evidence examinations can be done using only photographs (correctly taken), lifts or casts should also be taken. The important individualizing characteristics required to identify the source of an impression may not be visualized in a photograph. Also, for impressions in soil and snow, there is three-dimensional information that is lost in photographs. DO NOT clean the cast prior to submission. Package it with any dirt/debris still adhering.

### Tire Exemplars

- Test impressions (exemplars), made with the object suspected to be the source of an impression, are generally made in the laboratory. Tire exemplars are the exception and may be prepared by the investigator due to the necessity of making the impressions while the tires are still on the vehicle. The Crime Scene Response Team is also available to assist in preparing these exemplars.
- Tire exemplars can be made by preparing pieces of white poster board the length of one full rotation of the tire's circumference. A clean board is evenly rolled with black ink and the tire is rolled across this inked board. The tire is then rolled across a clean length of second poster board (also the length of the tire's circumference). The starting and ending position and the direction of the tire roll must be marked with chalk or crayon on the tire and the poster board. The tire information (position on vehicle, inside and/or outside edge, manufacturer, design name, size, and DOT serial number) should be written on the poster board. Be careful to prevent the rear tires from running over the front tire impressions. The vehicle may need to be

turned slightly to prevent such an overlap. The tires may be submitted with the test impressions.

### Sources of Impressions

- Just about any surface may have an impression, including soil, cement, flooring, wallboard, glass, bedding, etc.
- Clothing impressions on car finishes, bumpers, undercarriages, etc.
- Shoe impressions on the brake pedal in cars that come to a sudden stop.
- Tire impressions, including the manufacturer information on the sidewall, may sometimes be on the clothing in vehicle/pedestrian incidents.
- Shoe impressions in stomping cases may be on a victim's face and/or clothing.

### Sources of Knowns

- Weapons or other relevant items
- Clothing – collect as an intact object
- Shoes – collect as an intact object
- Tires – collect tire exemplar prints
- SICAR or other searches for manufacturer information may produce a lead which points to a source for a known

### Packaging

- Impressions and dust print lifts of impressions should be secured in boxes in a manner which prevents anything from coming into contact with the impression or lift. Plastic should never be used to package impressions or dust print lifts of impressions since the plastic can actually develop an electrostatic charge which can then remove portions of the impression or lift.
- Casts should be thoroughly air dried prior to packaging. Do NOT clean the casts. The cast should be cushioned and packaged in a cardboard box which allows the cast to continue drying. Never use plastic.
- All items should be clearly marked as to location, orientation to the scene, date, and agency information.

Images of the impressions are placed on a CD, DVD, or USB flash drive. Package the electronic medium in a letter size envelope and seal as an evidence item. Emailed imaged cannot be used as evidence in comparison to a known.

### Submission

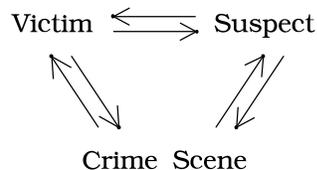
For comparison requests, the impressions and the possible sources must be submitted as separate items of evidence – not in the same sealed package. The accompanying RFLE should state which items should be compared in the Special Instructions section.

For SICAR requests, the impressions may be submitted electronically. Only images with impression information should be submitted. The file size for an image, or the total of multiple images, must not exceed 25 MBs. Submit a completed RFLE and the images as attachments to: [shoesearch@wsp.wa.gov](mailto:shoesearch@wsp.wa.gov). Any questions about this database can be sent to [Jeff.Jagmin@wsp.wa.gov](mailto:Jeff.Jagmin@wsp.wa.gov).

## MATERIALS (TRACE EVIDENCE)

Small, often microscopic, quantities of material have always been of interest to crime scene investigators. These particles can be the key to a successful investigation. An individual or object leaves behind and/or picks up traces of materials from another person or an environment, however brief and slight the contact. This concept is referred to as Locard's Principle of Exchange. The materials are often referred to as trace evidence. These materials may be fragments of either manufactured products or naturally occurring substances. The sample of unknown origin is referred to as the "Questioned" sample. The sample of known origin (the possible source) is referred to as the "Known" sample. Known samples and control or reference samples are used for comparison with questioned samples.

The diagram illustrates the principle of the exchange of trace evidence between suspect, victim, and the crime scene. Notice that the arrows go in both directions. Other versions of this diagram could include multiple suspects, multiple victims, multiple crime scenes, and the addition of weapons.



Evidence that results from this exchange can suggest a link between the suspect, the victim, and/or the crime scene. The connection is established by the comparison of trace evidence from a questioned source with samples from a known source (reference/control). For example, in the case of a person being attacked in their home by an intruder, the intruder may leave hairs and fibers on the victim and on the victim's furniture or carpet. Likewise the intruder may take away hairs or fibers from the victim's residence on clothing or shoes. Lastly, since the intruder had to get into and out of the scene, there is a possibility of the intruder leaving shoeprints either in the house or outside of the house at a point of entry. If the point of entry was a window, there could be glass fragments on the suspect's shoes. If the point of entry was a painted door pried open with a crowbar, then paint from the door may be transferred to the pry bar. The timely collection of evidence is critical. The collected evidence should include the questioned and known (comparison or control) samples from the victim, suspect, and the crime scene.

Trace evidence may be generally categorized by the type of material to be examined:

- Building Materials
- Fibers, Fabric, and Cordage
- Food, Gastric Contents, and Vomit
- Glass
- Hair
- Miscellaneous Materials
- Paint and Protective Coatings
- Tape and Adhesives
- Vehicle lamps
- Wood and other Botanicals

Each of these types of materials is described below. Each description of a material includes the types of examinations that may be conducted as well as specific precautions and recommendations for collection and packaging. Not all examinations can be performed on all types of materials. In general, examination of trace materials include: 1) Classification/Identification of the Material, 2) Comparative Associations, 3) Physical Match, 4) Damage Analysis, and 5) Generation of Investigative Leads. These general types of analyses are described as follows:

### **1) Classification/Identification of a Material**

Classification and/or identification of a material can assist in determining potential sources when a known sample is unavailable. For example, glass can be classified as from either containers (e.g. bottles and jars) or from windows (e.g. vehicles windows, residential windows, business doors, etc.). Classification of fibers as potentially from carpet, rope, or clothing may be important when examining fibers recovered from underneath a vehicle.

### **2) Comparative Associations**

The significance of a comparison of materials from a questioned sample and a known source is dependent on the type of material being compared and what is known about it. Questioned samples should be collected and packaged before known samples. Fibers, glass, paint, and tape have been studied extensively for decades. Such comparisons cannot conclusively establish that the questioned sample originated from the known source to the exclusion of all sources of similar manufacturing. The type of material, the number of characteristics evaluated, and the case scenario can indicate how much weight such a comparison can contribute in corroborating a version of events.

### **3) Physical Match**

Physical match examinations consist of the examination and comparison of broken, fragmented, cut, or torn items to determine if two or more pieces were at one time one item. Materials submitted for a physical match examination can include broken glass (from burglaries, vehicle accidents, shootings, etc.), automobile parts from accidents, broken wood or metal (bats, sticks, architectural structures, etc.), paint chips, tape, wires, plastic bags, household items, and any other type of material/object that may be physical evidence in a criminal investigation. Do NOT attempt to fit pieces together. Prematurely “fitting” pieces together can alter and/or destroy fine tips, shards, detail, etc. on the side edges of the pieces. These features are an important part of the examination and can add significant weight to conclusions when they are present. Documentation of such features is needed before the final “fitting together” is attempted and documented.

### **4) Damage Analysis**

How a material is damaged may provide information about how the crime occurred, and/or corroborate a version of events. For example, damage analysis of clothing may be able to determine if a hole was cut or torn. Examination of glass may tell whether a window was broken from the inside or outside. Damage analysis of window screen could tell whether a particular weapon could have been used to penetrate the screen.

### **5) Generation of an Investigative Lead**

Analysis of materials may be able to generate an investigative lead. For example, an automotive paint chip that includes layers from the original manufacturer's paint system can be searched against a database to generate a possible list of make/model/year vehicles as potential sources of that paint chip. Examinations of clothing can generate a list of particles present – including particles that may be related to work place settings and/or hobbies that can help narrow a list of suspects.

## GENERAL TRACE COLLECTION AND PACKAGING GUIDELINES

The investigator must use caution to avoid damage to or contamination of evidence at the crime scene. After the incident, the suspect and the victim must not come in contact or brought be back to the crime scene while it is still being processed. Items from different individuals (suspect(s) and victim(s)) should ALWAYS be collected and processed in separate areas by different evidence technicians whenever possible, or at separate times with an intervening thorough cleaning of the area. Always photograph an item before altering it or collecting anything from it.

Control/reference samples must be collected as soon as possible to avoid loss and change. Collect and submit comparison or control samples from each source or potential source of questioned materials with each carefully labeled as to specific location collected. If control samples from both the victim and suspect are not available, contact the crime laboratory to determine what evidence should be submitted. Both control and questioned samples usually must be submitted before any comparisons can be made.

Each item or container must be properly secured, sealed and labeled. The label must describe the contents, the item number, the donor or source if known (do not identify the item as from the "victim" or "suspect"- please provide a name), location where found, date, time, and name of person collecting the evidence. The investigator should make notes as to the condition of the evidence and any other observations of value. All containers must be sealed to ensure that no leakage or contamination occurs. Package so that if a container opens or tears during shipping, the material is not lost and does not leak out and contaminate other evidence or pose a safety hazard.

### Intact Objects

Whenever possible, the entire object with suspected trace evidence should be submitted. If suspected trace evidence (fibers, building materials, etc.) is imbedded in an object (such as an automotive dashboard, a painted car part or bullet), do not attempt to remove the trace evidence. If possible, submit the entire object or cut out the portion with the imbedded trace. Any adhering trace evidence may then be recovered later in a controlled laboratory environment.

### Clothing and Bedding

Recover the clothing to be examined, taking care to avoid contamination and loss of trace evidence. Do not attempt to collect the trace material. Collect the clothing from different individuals [suspect(s) and victim(s)] in different locations and by different evidence technicians whenever possible. Collect the outermost layer separate from the inner layers. Collect shoes separate from the rest of the clothing. Air dry clothing items at room temperature in a protected area and place a clean paper underneath the item to catch any evidence that falls during drying. Also place a clean piece of paper over the item to protect against contamination while drying. Do not use fans to dry the items. Dry suspect's clothing in a separate location from the victim's clothing. Place the dry clothing, along with the paper used in the drying process, in a paper bag. Be sure the victim's clothing is packaged separately from the suspect's clothing and that the bag is large enough such that contents fill no more than 2/3 of the bag. Label and seal the bag.

### Tape Lifts

Clear “book” tape and laser printer transparency sheets (found in any office supply store) may be used to collect trace materials from larger surface areas such as clothing and vehicle upholstery. The tape roll must be stored in a closed clean container, such as a ziplock bag, to prevent extraneous fibers and debris from contaminating the edges of the tape. Remove a strip of clear tape from the roll and fold over each end to form “handles” for manipulating the tape during collection. Apply the adhesive side of the tape to the fabric. Lift the tape by the “handles” and re-apply several times. Stop when the tape begins to lose its tackiness, but still has enough clean adhesive to adhere to the clear transparency sheet. Make sure not to overload the taping. Apply the tape strip to the transparency sheet adhesive side down. Do not fold the tape lift onto itself (they are difficult to work with). Do not place the tape onto cardboard or paper (it greatly complicates the examination process). Label the transparency sheet with the location that you tape lifted. Place tape lifts from different locations on separate transparency sheets.

If the precise location or distribution of questioned fibers on an item is needed, an item may be “mapped” by taking a “one-to-one” tape lift. In this method each tape strip is applied to the surface one time only. The tape strips are then placed on the transparency sheet in the same arrangement as they were applied to the evidence surface. It is sometimes easier to keep track of the placement if all of the tape strips are applied and then all of the tape strips are sequentially removed and placed on the transparency sheet(s).

The tape lift contains questioned fibers. The remaining fabric, from which the tape lift was taken, is a possible known fiber source and should also be collected.

### Sticky Notes

If this is your only option at the time, and if the entire object cannot be submitted, small amounts of trace materials may be collected using the adhesive surface of a sticky note. Smaller areas with fewer questioned trace materials, such as fibers or hairs, may be “tape lifted” using the adhesive area of sticky notes (Post-it™ notes). Apply the clean adhesive side of a sticky note to the surface to collect the loose trace materials, or pick the trace materials off the item using clean tweezers or forceps and place them on the sticky note adhesive. Marking the note paper with an arrow to the questioned trace is an option for more easily locating the trace in laboratory examinations. Fold the note paper over to protect the adhesive surface from collecting any additional debris. Label the note paper with the location that was tape lifted. The sticky note contains questioned fibers. Avoid collecting tiny particulates on sticky note papers as recovery is difficult and the adhesive will contaminate the item.

If trace materials are collected from a vehicle, place the collected materials in paper wrappers or small tins to prevent loss. Labeling should include the location on the vehicle, make, model, year, VIN, and license plate number. Place smaller packages into a second container, also labeled properly.

### Forceps

Use clean forceps to remove individual items of trace evidence, such as fibers, hair or glass, and clean the forceps between different samples.

### Scalpel Scraping

Use for sticky materials

### Swabbing

Use as a last resort for collection of trace particles. Often the cotton swab interferes with recovery of the particles in the lab. If used, also prepare a scalpel scraping.

### Friable Materials

Sample friable materials that are subject to easily crumbling by simply tearing, breaking, pulling, or picking (e.g. wall insulation).

## BUILDING MATERIALS

Building materials comprise a very large variety of particles. Primary and secondary transfer of building materials between individuals, tools, and weapons may occur during practically any crime. The examination of trace materials on discharged bullets may help define bullet's path including impact with intervening materials. Fibrous insulation, gypsum wallboard dust, cement, caulking, wood dust, etc. may transfer to a suspect's clothing and hair during a burglary. Tools found in a suspect's possession may have building materials smeared on or adhering to them which may offer important clues in an investigation. Motor vehicles involved in a collision may be an excellent repository of building materials from contact with an immovable object such as a concrete barrier or wooden utility pole.

### **Precautions**

Asbestos has been used in a variety of older building materials and has been identified as a hazardous material. Please contact the laboratory for guidance prior to sampling. Care should be taken to use proper personal protective equipment and minimize handling of the item. Materials suspected to contain asbestos should be packaged in non-porous airtight containers such as properly sealed paint cans.

Footwear impressions are often present in drywall dust and at construction sites. Be sure to read the Impressions section for proper preservation.

### **Significance**

The examination and comparison of building materials may reveal:

#### *Classification/Identification of the Material*

- Origin of the material (e.g. roofing vs. insulation)
- Possible age of material or period of installation (e.g. asbestos products)

#### *Comparative Associations*

- A possibility of common origin if the questioned building material and control samples show similarities in physical and chemical characteristics.

#### *Physical Match*

- Two broken pieces were at one time a single object.

#### *Damage Analysis*

- Building materials such as wood or concrete may show evidence of damage sustained during forceful contact (e.g. hammer head design impressed into lumber along with a transfer of wood to hammer).

### ***Generation of Investigative Leads***

- Assist in bullet path reconstruction by an examination of material on bullets.
- Determination of hardened concrete usage and source of aggregate (e.g. concrete is manufactured with different ingredients depending upon end usage).

### **Sources of Building Materials**

- Construction sites
- Any dwelling (e.g. single family home, apartment, commercial business, garage, etc.)
- Highway pavement, sidewalks, highway markers, utility poles
- Dry Wall
- Submit control samples from each source of broken building material. If it is important to know whether the building material was broken from the inside or the outside, the submitted control fragments must be carefully marked as to the collection location and/or facing position. Consult the crime laboratory for details.

### **Packaging**

- Materials found in different areas must be packaged separately.
- If the material is moist or wet upon collection, air dry completely and then package. Do not place moist building materials in plastic or glass containers.
- Small Pieces - Small pieces of material should be placed in a paper fold, sealed, labeled, and packaged in a small rigid container (e.g., a pill box, metal vial). The container must also be sealed and properly labeled.
- Large Pieces - Large pieces of material should be packaged in rigid containers. Use packing material such as cardboard or part of a corrugated carton to avoid breakage and to protect the edges. Hand delivery is the preferred way to submit large pieces, as it avoids the task of extensive packaging and reduces the risk of breakage.
- Footwear and tire impressions are often preserved in fine powdery building materials such as wallboard dust. Package so overlying packaging material is not rubbing or smearing the impression.
- Tools with building materials must be protected to avoid loss or contamination. The area containing the material should be protected with soft tissue paper securely taped over the area of interest, and the tool packaged securely into an appropriate container (e.g., box).

## **FIBERS, FABRIC, AND CORDAGE**

The transfer of fibers and fragments of cloth can be the result of such actions as violence to a person with a weapon or with a vehicle, clothing being snagged and/or torn, or the contact of clothing with another article of clothing. Comparison of questioned and control fibers and threads cannot conclusively establish that they are of common origin. However, the forensic scientist can determine the color, type, and sometimes the product use of the fibers. Types of fibers may be categorized by

origin: animal, plant, man-made, mineral, or a mixture. Various product uses are garments, carpets, bedding, clothing, upholstery, etc.

Clothing damage assessment related to firearm's discharge is conducted in the Firearms/Toolmarks Unit of the laboratory.

Impressions of fabrics or other textiles are covered under the Impressions subsection.

## Precautions

Fibers are not readily visible and may be transferred inadvertently by touching one object that has loose fibers and then touching a second object, leaving those fibers behind. Fibers can also become air borne, settling on surfaces that will subsequently contact other items.

Loose fibers on the surface of an item are generally questioned fibers. The fibers that comprise an item are considered known fibers. These two should be collected separately. Collect the questioned fibers BEFORE the known fibers. Remember to look for all possible sources for the questioned fibers. That source may have fibers on it that could establish a two-way transfer.

Damaged regions of textiles are fragile and may contain microscopic particles transferred during the damage process. The condition of the damaged threads should be disturbed as little as possible to allow an accurate assessment of the damage and to preserve any transferred particles.

- Do not try to align damaged clothing or other textiles to each other.
- Do not touch damaged regions of textiles.
- Do not place objects (such as rods) into the damaged region.

Fiber evidence is easily and rapidly lost and should be collected as soon as possible with handling of the items kept to a minimum. Do not touch or insert objects (ie. trajectory rods, pens, or fingers) into damaged areas of a fabric.

If the item being collected is a rope or binding and it must be cut to remove it, choose an area away from any knots, if possible. Wrap this area of the rope with tape. Cut through the tape and mark the tape with the initials of who cut it and the date.

Do NOT use a vacuum to collect fibers. Even vacuum assemblies designed for collection of trace materials often lose fibers due to the particle size limit on the filter. They also pick up more dirt and extraneous materials and cause static issues with the fibers that are collected.

## Significance

The examination of fibers, fabric, and cordage may reveal:

### *Classification/Identification of the Material*

- Typical end use or origin of the fiber or fabric (e.g. carpeting, clothing, ropes)
- Fabric construction (e.g. knit, woven, felted)
- Cordage type (e.g. twisted, single braid, double braid, kernmantle, etc.)
- Fiber types (e.g. cotton, ramie, linen, wool, nylon, polypropylene, polyester, etc.)

### *Comparative Associations*

- Contact between two or more persons.
- Contact with objects such as blankets, upholstery, carpets, and drapes.
- Contact between a vehicle and victim. The fibers may be embedded on the exterior of the vehicle.
- Contact between the suspect and the crime scene.
- Contact of suspect's clothing and broken glass entry of residence.
- Presence of a person or object in a particular place.
  - victim clothing fibers in a suspect vehicle trunk or passenger cabin.
  - suspect residence fibers on a blanket used to wrap and conceal a victim.
  - suspect clothing fibers on a broken window pane.

### *Physical Match*

- Two pieces of fabric, carpeting, or other textile were at one time a single object.

### *Damage Analysis*

- Nature of damage to fabric (e.g. tearing, ripping, cutting, puncture, type of knife, etc.).
- Could a particular weapon be the source of the damage (inclusion/exclusion only).
- Could the damage be produced in the manner described by the suspect or victim?

### *Generation of Investigative Leads*

- Who was driving at the time of the collision? Fibers may assist in locating the positions of persons riding in a vehicle, if the fibers are embedded or are firmly adhering to a surface. The fibers may be fused into plastic parts in the interior of the car or an airbag.

### **Sources of Fibers**

- Trunks of vehicles
- Knife blades/gun barrels/weapons
- Shoe outsoles (carpet transfers)
- Blankets
- Ropes/Bindings
- Upholstery (vehicle or residential)
- Exterior surfaces and undersides of vehicles in "hit-and-run" incidents
- Suspect hair (Ski mask transfers)
- Victim hair (transported in vehicle truck or wrapped in blanket that was subsequently removed)

### **Packaging**

#### Carpeting

Be sure the carpet samples are dry. Air dry following the same guidelines as clothing is needed.

#### Fabric Impressions

Photograph, collect, and package the Fabric Impression according the Impression subsection of this manual.

#### Other Objects

Be sure the object is dry. Air dry following the same guidelines as clothing if needed. Loosely fold paper around the dry object using either the paper that it was dried with or new paper. Place the paper wrapped object in either a paper bag or a box. Use a box if the object is heavy and/or has sharp edges (e.g. knives,

tools, broken glass shards, etc.). Use either extra wadded paper or zip ties to secure the object from moving around excessively in the box or paper bag. Label the box or paper bag and seal.

#### Rope/Bindings

Place the dry rope, wrapped in the paper used in the drying process, in a paper bag. Label and seal the bag.

#### Upholstery (Fabric)

Collect the questioned samples using tape lifts. Collect known samples AFTER the questioned sample. The known sample consists of cut piece(s). These pieces should be dry and placed in either a paper bag or a paper envelope and sealed. Be sure to label the outer packaging with the information about where the sample was collected. If the sample was from a vehicle, include either the license plate or VIN and from which seat the upholstery was taken (i.e. Driver, Front Passenger, Back Driver, Back Passenger, etc.).

## **FOOD, GASTRIC CONTENTS, AND VOMIT**

Food traces are ubiquitous in dwellings and vehicles and can be found on clothing and bedding. These particles may be transferred to practically any surface. Common food traces include spices, herbs, salt, sugar, starches, cereal grain, pastry and bread crumbs, meat, vegetables, and fruits. Food particles are examined microscopically and identified to a food type (e.g. cereal grains, spice, meat). An examination of food particles may be used as associative evidence linking people, places and objects. Vomit samples submitted to the laboratory are of two types; gastric samples collected during autopsy or dried stains on materials such as clothing. An examination of gastric contents can assist in establishing time of death. Food particles in vomit stains can be compared to an individual's known gastric contents.

### **Precautions**

Biological hazards exist when handling gastric contents which could be contaminated with infectious organisms.

### **Significance**

The examination of food and vomit may reveal:

#### *Classification/Identification of the Material*

- Identification of the type of substance.

#### *Comparative Associations*

- Origin of the vomit (e.g. Asian restaurant vs. breakfast cereal).
- A possibility of common origin if the questioned food specimen and control samples show similarities. The rarity and diversity of the materials found would have probative significance.

#### *Generation of Investigative Leads*

- Establishing a time line. Food products are retained in the stomach for up to approximately 8 hours depending upon the type of food and biological/environmental conditions.

### **Sources of Questioned Materials**

### Clothing

See General Trace Collection and Packaging Guidelines.

### Gastric Contents

Gastric contents collected at autopsy need to be well secured in an air tight container. The vomit sample should be refrigerated prior to sending it to the laboratory.

### Dried Food Particles

Dried food particles can be picked up with a forceps or a sticky note.

### Liquids

Liquid foods and vomit can be spooned or pipetted.

## **Sources of Known Materials**

### Dried Food Particles

Dried food particles can be picked up with a forceps or a sticky note.

### Liquids

Liquid foods and can be spooned or pipetted.

### Meat

### Control Samples

Submit control samples from food ingredients or food products such as spices, cookies, and beef jerky.

## **Packaging**

- Vomit stains on materials must be air dried prior to packaging and submission to the laboratory.
- If the item containing the vomit stain cannot be sent to the laboratory, scrape off the dried stain into a small paper fold or envelope. Liquid specimens should be placed in plastic or glass containers with a screw top lid and should be refrigerated or frozen as soon as possible. Spooning canor pippetting can be used to collect liquid vomit. Use a clean spoon or pipette for each sample collected.

## GLASS

Forensic glass examinations usually involve the comparison of a questioned glass sample with a known sample from a broken glass source. The analysis can reveal if two samples of glass have a possible common origin. If only questioned glass fragments are recovered, the end use, or type of glass, may be determined (e. g. tempered glass, bottle glass, laminated glass, etc.) and provide information to locate the source. The way the glass is broken and the position of the glass fragments may reveal the direction of a projectile and potentially the order in which several projectiles penetrated a glass pane or window.

Homicides, burglaries, hit-and-run cases, and assault cases may provide useful glass evidence. With larger pieces of glass, it may be possible to physically fit the questioned glass to larger pieces of the control sample of glass. These examinations require the complete collection of the control glass pieces.

## **Precautions**

Broken glass can cut hands, bags, and other evidence. Be sure to take proper precautions when handling glass evidence. Wear leather gloves underneath the disposable gloves when handling sharp glass fragments. Alternatively, use clean forceps, or a clean hand shovel with a clean piece of cardboard as a dust pan to collect glass fragments. Clean forceps, hand shovels and improvised dust pans between samples.

## **Significance**

The examination of glass may reveal:

### *Classification/Identification of the Material*

- Type of glass – tempered, laminated, bottle.

### *Comparative Associations*

- A possible association between a questioned sample and a known source.

### *Physical Match*

- Broken pieces of glass were at one time a single piece of glass.

### *Damage Analysis*

- The direction of force that broke the glass.
- The direction of travel of a projectile that perforated the glass.

## **Sources of Questioned Samples**

### Clothing

See General Trace Evidence Collection and Packaging Guidelines.

### Ground/Floor

Use hand shovel/scooping method. If soil is included in the glass sample, be sure to allow the material to air dry at room temperature in a protected area and place a clean piece of paper over the item to protect against contamination while drying. Glass on the ground is considered a questioned sample, regardless of proximity to a broken object.

### Traffic Scenes

At traffic scenes, it is important to search a wide area. Glass fragments can travel appreciable distances in many directions; pieces of glass may drop off a fleeing vehicle some distance from the scene. All glass fragments must be recovered, with each different location identified and packaged separately, especially glass from headlights, tail lights, and signal indicators.

### Shoes

Collect as an intact object separate from clothing. Glass fragments are often embedded in the soles and heels of shoes as one walks over broken glass. Do not remove the glass from the shoes. Wrap the shoes in clean paper and place them into separate, clean paper bags. Control samples collected at the scene should be submitted separately. Avoid contamination.

### Windows/Doors

For questions regarding direction of force or impact, submitting the entire pane of glass is recommended. questioned evidence

- Low Velocity Forces - If the direction of force which broke the pane of glass is to be determined, all of the glass must be retrieved. Low velocity forces include breakage by a person's hand, a baseball bat, a hammer, etc. Glass remaining in the window frame must be marked so the surfaces can be identified as "inside" or "outside," and may need to be taped to prevent loss or further breakage. The amount of glass on the ground or floor on each side of the frame should be noted and collected separately. Photographs of the window frame should be taken prior to collection of the complete frame.
- Bullet Holes - If projectile holes, such as bullet holes, are to be examined, the entire pane of glass should be submitted intact with "inside" or "outside" indicated. Care must be taken not to disturb any possible gunshot residue on the surface of the glass. The glass may have to be taped on the exit surface to hold it together. If the exit side cannot be determined, consult with the crime laboratory.

## Sources of Known Samples

### Windows/Doors

When collecting glass as a known or comparison sample, collect pieces from different parts of the frame if possible. Many pieces are needed in order to document the variation of chemical features from that pane of glass. If multiple panes are present, collect separate samples from each broken pane. If the window/door is double paned, be sure to collect each of the broken panes separately and label which pane is "exterior" and which pane is "interior". Collect fragments from the frame using clean forceps. A general rule of thumb is to collect at least 10 pieces of tempered glass or enough flat glass to cover a 2 inches square. More glass is always better. If not enough glass is possible, collect and submit what is present.

### Headlights

The glass still in a headlight rim frame can be considered Known evidence for comparisons. Remember vehicle filaments may also be analyzed for whether the lamp was on or off (see the subsection Vehicle Lamp Evidence).

## Packaging

- Glass found in different areas must be packaged separately.
- Use metal cans, hard plastic containers, cardboard boxes, or pasteboard boxes to prevent loss of glass particles. Glass may tear through both paper and plastic bags.
- Small pieces of glass should be placed in a paperfold, sealed, labeled, and packaged in a small rigid container (e.g., a pill box, metal vial). The container must also be sealed and properly labeled.
- Large pieces of glass should be packaged in rigid containers. Use packing material such as cardboard or part of a corrugated carton to avoid breakage and to protect the edges. Hand delivery is the preferred way to submit large pieces of glass, as it avoids the task of extensive packaging and reduces the risk of breakage.
- Package so that if a container opens or tears during shipping, the glass is not lost and does not leak out and contaminate other glass evidence or pose a safety hazard.

## Submission

Evidence for requests of direction of force need to be hand delivered to the lab. **Do not mail.**

Write in the Special Instructions section of the RFLE what type of glass examination is desired (i.e. physical match, direction of force, comparison, classification of type of glass, etc.).

## HAIR

Hair evidence may be found in all types of crimes, especially in crimes where bodily contact has been made, such as in crimes involving homicide, rape, and/or assault. Hairs may be examined for human or animal origin, if a hair may be suitable for nuclear or mitochondrial DNA analysis, if human what part of the body it may have come from, and any acquired characteristics such as burned, cut by glass, or natural color altered.

Microscopic hair comparisons are not performed in the crime laboratory.

Hairs suitable for DNA analysis are transferred to the DNA section for further analysis. Animal hair DNA analysis is not performed in the crime laboratory.

### **Precautions**

Hairs may be used for DNA analysis. As such, they may be easily contaminated by handler DNA. Use DNA precautions when collecting hair evidence. Be sure to change your gloves frequently.

### **Significance**

Microscopic examination and screening of hair can reveal:

#### *Classification/Identification of the Material*

- If the hairs are of human or non-human origin.
- If human, from what part of the body the hair may have originated.

#### *Comparative Associations*

- Hairs can be determined if suitable for nuclear and/or mitochondrial DNA analysis. Microscopic hair comparisons are not performed.

#### *Damage Analysis*

- If the hair has been subjected to trauma, such as high temperatures, flame, or a crushing blow.
- If the hair was broken by glass.

#### *Generation of Investigative Leads*

- If the hairs were forcibly removed from the body or were naturally shed.
- If the hairs have been cut.
- If the hairs have been chemically treated.
- If the hair indicates a hair-related disease.
- If the hair exhibits adhering trace evidence.

## Sources of Questioned Samples

### Clothing and Bedding

See General Trace Collection and Packaging Guidelines

### Bodies

Check the hands of assault and homicide victims. Hairs may be found clutched in the hands or under the fingernails. Hairs may also be found on the bodies. Collect with forceps or sticky notes.

### Combing

Collected as part of Sexual Assault Kits. Refer to the professional resources provided under the medical guidelines at the Harborview Abuse and Trauma Center [website](#) ([Recommended Guidelines Adult and Adolescent 2017](#)) for packaging guidelines.

### Embedded in Object

If hair is firmly attached or embedded in an object, do not remove the hair. Send the object with the adhering hair to the crime laboratory, if feasible. Otherwise, photograph the hair in place and then remove the hair carefully, keeping it intact. Contact the crime laboratory if there is any question on how to proceed.

### Loose Tufts and Hairs

Collect with forceps of a sticky note. Fold the note over immediately after collection to prevent air borne particles contaminating the sticky note. Be sure to label the sticky note with the location from where the loose hairs were collected. Place in an envelope or bag labeled appropriately.

### Upholstery (Fabric)

Use forceps to collect long hairs. Then use tape lifts to remove loose small hairs from fabric upholstery. If the upholstery is from a vehicle, be sure to label the transparency film with the tapings as to which seat it was taken from (Driver, Front Passenger, Back Driver, Back Passenger).

## Sources of Known Samples

### Pulled Hairs

Pulled hairs are not required for analysis because microscopic hair comparisons are not performed. However, if a large number of hairs are recovered from an object, a pulled hair sample (pubic and/or head) may assist in screening the hairs for the best ones to send to DNA analysis. Refer to the professional resources provided under the medical guidelines at the Harborview Abuse and Trauma Center [website](#) (Recommended Guidelines Adult and Adolescent Sexual) for collection and packaging guidelines.

## Packaging

Do not combine hairs that are collected from different locations. Place the hairs from each location in separate paper containers or plastic bags. Place these small containers into larger manila envelopes, properly seal and label, and submit to the crime laboratory.

Place the hairs in clean paper or small plastic bags (see page 18 for paperfolds). Seal with tape and write the date, time, item number, description of the evidence, and the location where it was found. Then place

the sealed paper package into an envelope. Seal the envelope and identify the contents; note the date, time, and initials of the person handling the evidence.

If the hairs are placed directly into an envelope, make sure that all the flaps and corners of the envelope are sealed with tape. Even a slight gap can cause hairs to be lost.

## Submission

- Complete the Special Instructions section of the RFLE for the type of hair exam is desired (suitability for DNA analysis, body origin of hair, type of hair damage, etc).

## MISCELLANEOUS MATERIALS

An abundance of materials and particles that do not neatly fall into the above categories are submitted to the Materials Analysis Unit of the crime laboratory for analysis. Miscellaneous materials have included cigarettes, glitter, plastics, caulks, rubber bands, owl pellets, bird nests, paper match books, paperclips, filler ingredients in drugs, glassy material from burnt grass, soot, dust, debris from fingernails, etc. The crime lab does not perform geo-sourcing (identifying a geographical area as a source of a soil) or comparisons of the mineralogical components of soil. The lab can analyze and compare botanical materials, manufactured materials (e.g. plastic fragments), and some specific types of natural materials sold as lawn and garden products (e.g. perlite, vermiculate, diatomaceous earth, volcanic ash, pumice, etc.). Each crime scene offers the investigating officer an opportunity to critically observe the surrounding area and determine which materials may have evidentiary significance. Please call the Materials Analysis Unit if you have any questions regarding what to collect.

## Precautions and Packaging

See General Trace Collection and Packaging Guidelines

## Significance

The examination of miscellaneous materials may reveal:

### *Classification/Identification of the Material*

- What kind of plastic an object is made from.

### *Comparative Associations*

- If a questioned material could have come from a specific source.

### *Physical Match*

- If fragments were part of a single object at one time.

### *Damage Analysis*

- If an object was damaged by a specific instrument. For example, if a window screen could have been cut with a specific knife.

### *Generation of Investigative Leads*

- Possible manufacturing information.

### **Submission**

Complete the Special Instructions section of the RFLE for the kind of information you are looking for by this examination (manufacturing information, a comparison of two items of evidence, an assessment of the damage, etc.).

## PAINT AND OTHER PROTECTIVE COATINGS

Chips and fragments of protective coatings, such as paint, varnish, lacquer, enamels, and plastics may be found at the scenes of hit-and-run cases and burglaries involving forced entries. A transfer of paint can occur when two vehicles collide. Chips of paint at the accident scene or on the victim's clothing may produce information regarding the year, make, and model of the vehicle which fled the scene. Traces of paint on burglary tools may connect these tools to the burglary scene.

### **Precautions**

Be cautious when using a scalpel or razor blade to collect paint samples as they can break and/or cut.

### **Significance**

The examination and comparison of paint or other protective coating chips and fragments may reveal:

#### *Classification/Identification of the Material*

- The type of paint or coating and its applications. This information may lead to a possible source.

#### *Comparative Associations*

- A possibility of common origin if the questioned chips and control samples show similarities in physical and chemical characteristics. Multilayered chips which also show similarities and correspondence in the number of layers, order of colors, and thickness of the layers can increase the probability of a common origin to a very high degree.

#### *Physical Match*

- That the paint chip from the scene came from a particular object or vehicle by a physical match (i.e., the questioned paint chip edges fit like a piece of a jigsaw puzzle with edges of the damaged area).

### *Generation of Investigative Leads*

- Chips left by a vehicle at a hit-and-run scene may produce information regarding the make, model, and year of manufacture.

### **Collection**

In all cases, the control samples must be taken from an undamaged area immediately adjacent to the area

of damage or of interest. The collected chips must contain all of the layers down to the underlying surface. If a physical match is possible, all paint from the damaged area must be collected or the item submitted.

When investigating a hit-and-run collision, control samples should be taken from each vehicle. The samples should be taken from the undamaged area on the same panel immediately adjacent to the damage. Similar control samples must be taken from the suspect vehicle when it is apprehended. Different body panels or parts may have different paint or layer structure. Samples from each damaged panel must be taken (i.e., fender and door).

At burglary scenes, control samples should be taken from an area immediately adjacent to the tool mark. Do not touch the tool mark itself; it may be altered and rendered useless for later tool mark comparison examinations. The paint on a door or window jamb may not be the same as on the door or window itself. If it appears that paint may have transferred from both surfaces, control samples must be taken from each surface.

## Sources of Paint and Protective Coating Materials

Both questioned and known samples for:

- Vehicle hoods, doors, side panels, bumpers
- Tools
- Other objects and coated surfaces
- Clothing items from victim and suspect

## Packaging

- Paper-folds and plastic or paper envelopes can be used to collect the paint samples. Paper is preferred over plastic because of the static electricity buildup problems of plastic.
- Each of the recovered items must be packaged separately, properly labeled, and sealed.
- If a vehicle is involved, labeling should include the make, model, year, VIN, and license plate number. Also indicate from what part of the vehicle the sample was taken (i.e. damaged area from front quarter panel, undamaged region near damaged area of front bumper, etc.).
- Indicate from where a sample was taken (i.e. ground near victim, exterior side of front door, damaged region of East wall of living room, etc.).
- Envelopes must be sealed on the corners with tape to ensure that no leakage occurs. Put the paint chips into a folded paper packet and label, and then place the packet into a second envelope, also labeled properly.
- Tools - Tools with paint smears must be protected to avoid loss or contamination of the questioned paint. The area containing the paint smear should be protected with soft tissue paper, and the tool packaged securely into an appropriate container (e.g., box).
- If paint chips are to be submitted for a possible physical match, they must be packaged so that the chips do not break. The chips must be protected with tissue paper or cotton and placed in a small, rigid container.

## Submission

If submitting paint for comparisons, be sure to identify on the RFLE which items are the questioned samples and which samples are the known. Indicate in the Special Instructions section what comparisons should be performed.

If submitting paint for an investigative lead, please indicate on the RFLE that a make/model search is desired and from which items.

## TAPE

Tape consists of at least a flexible backing and an adhesive. A variety of tapes is commercially available, such as duct, vinyl electrical, packaging, and masking tape. Overall construction and chemical components will vary between product types and within a single tape type.

Tapes may be found at a variety of crime scenes, such as wrapped around improvised explosive devices (IEDs), used to bind victims, or on threatening letters or envelopes. Based on the types of cases in which they are involved, tape pieces and tape rolls are generally easy to find. The examination of tape can provide investigative leads, corroborate statements or events, and associate scenes or a person to a scene. Tape may also provide a variety of evidence types, including latent prints, DNA, hairs/fibers, explosive residue, and miscellaneous trace evidence. Please consult the laboratory to determine the highest priority before examination.

### **Precautions**

A chemical in many report covers and other flexible plastic sheets can interfere with the analysis of tape adhesives. Therefore, ONLY use laser printer transparency film or fire-debris plastic bags when packaging strips of questioned tape.

### **Significance**

The examination and comparison of tapes and adhesives may reveal:

#### *Classification/Identification of the Material*

- Type of adhesive (electrical tape, duct tape, rubber cement, etc.)
- Scrim (fiber) count may indicate household versus commercial use duct tape.

#### *Comparative Associations*

- A possibility of common origin between a questioned sample and roll of tape.

#### *Physical Match*

- The tape itself can be examined for a physical match with known tapes.

### **Collection**

- When possible, submit tape still adhering to the substrate to minimize loss of trace evidence, latent fingerprints, or contact impressions.
- If unable to submit substrate, do not distort or tear the tape during removal.
- If the tape is cut during removal, mark cut ends accordingly.

### **Sources of Questioned Samples**

- Pieces

- Bindings
- Wrappings

## Sources of Known Samples

- Rolls of tape

## Packaging

### Pieces

Individual pieces should be placed on clear transparency film (look for transparency film for laser printers at any office supply store). An alternative are fire debris plastic bags. Do not place pieces of tape on plastic document protectors because they contain chemicals that interfere with analysis of the adhesives.

Do NOT place pieces of tape on paper because the paper is hard to remove from the adhesive.

Do NOT wad or fold the tape onto itself.

### Rolls

Tape rolls can be placed in a cardboard box, envelope or paper bag.

### Wrappings or Bindings

Place in a plastic fire debris bag. Do NOT wad if at all possible.

## VEHICLE LAMP EVIDENCE

Vehicle lamps are submitted when the question of whether a vehicle's lamps were on (incandescent) or off at the time of an impact may be critical to the investigation of a case. Examinations are conducted by obtaining lamp(s) from the area of impact on the vehicle and examining the filaments and other portions of the lamp affected by the filaments. Exams of other lamps at a distance from impacts can only yield information as to whether the lamp is functional based on continuity of the filaments. These types of exams should be limited to lamps from motor vehicles (i.e. cars, trucks, motorcycles), since the empirical data upon which these lamp exams are based come from motor vehicles. If lamps from other types of vehicles are examined, caution must be used in interpreting motor vehicle data.

## Precautions

- Never turn on a vehicle's headlamps after an accident. If the glass envelope of a bulb has fractured, the filament can burn out when energized and show indications of being incandescent at impact.
- The evidentiary value of vehicle lamps can be lost if the lamps are not collected, packaged, and transported using the correct procedures. Lamp filaments are often fragile after an impact. Lamps should always be hand carried to the crime laboratory rather than mailed or shipped.

## Significance

Vehicle lamp conclusions range from "on" (incandescent) at the time of impact to "off" at the time of the impact. The condition of vehicle lamps after an impact can often be explained by more than one set of circumstances. For this reason, vehicle lamp cases are often inconclusive.

## Collection and Preservation

- Photograph the lamps in place prior to removal. Record the dash lamp switch position and if the vehicle is equipped with daylight running lamps.
- Prior to removing a lamp, mark the 12 o'clock or "up" position.
- If possible, measure continuity of the filaments using a circuit tester prior to collecting the lamps. Do not test continuity by turning on the lamps.
- Avoid breaking any filaments during handling or transporting lamps. If a filament is accidentally broken, make note of the fact and submit the information with the lamp.
- Whenever possible, submit all of the lamps from the vehicle in question.
- If a lamp is intact and easily removed from its socket, it can be removed as normal for replacing the lamp.
- Broken lamps should be removed with the lamp base and packaged to protect the filaments. One method of accomplishing this is to push the lamp base through a hole in the bottom of a drink cup, cut the bottom from a second cup to put over the lamp as a spacer, and use a third cup as a cover. Tape the cups together.
- Check the lamp housings and surrounding areas for loose filament fragments. Use tweezers or "Post-it" notes to collect any fragments of loose filaments present. These can then be packaged in plastic bags or envelopes.
- Do not place packaging materials around the filaments of broken lamps.
- Provide a diagram of the accident, speeds and directions involved, vehicle information, and photographs of the damage. Include any additional relevant information, such as number of impacts, any prior impacts the lamps may have been subjected to, time of day, and weather conditions.
- When the lamp is removed from the vehicle, label with the exact location, usage, and vehicle information (year, make, model, license number, and VIN).

## Packaging

- Verify that the lamp is labeled with the exact location, usage, and vehicle information (year, make, model, license number, and VIN).
- Ensure that the lamps are protected from shock and that all packaging materials are well sealed.

## Submission

- Hand carry to deliver all vehicle lamps. Failure to hand carry vehicle lamps can result in a loss of information. There are circumstances when the damage to a lamp can be used to determine if it was incandescent at the time of an impact only if it can be demonstrated that the damage did not occur subsequent to the impact.

## WOOD AND OTHER BOTANICALS

Botanical examination typically involves small, often incomplete fragments of leaves, woody and non-woody fibers, needles, grass, stems, thorns, weeds, flowers, tobacco, seeds, diatoms, pollen and spores which are found as associative evidence on or in clothing, vehicles and soil. Species identification is seldom performed with the exception of some woody material including lumber and pulpmwood.

## Precautions

Vegetative materials rot easily. Do not place moist botanicals in plastic or glass containers. If the material is moist or wet upon collection, air dry completely and then package.

## Significance

The examination and comparison of botanicals may reveal:

### *Classification/Identification of the Material*

- Identification of the type of substance
- Origin of the material (e.g. hardwood forest vs. mangrove swamp)

### *Comparative Associations*

- Comparison of a questioned botanical specimen and control samples may show similarities. The rarity and diversity of the materials found could have probative significance.

### *Physical Match*

- Two broken pieces or fragments were at one time a single object.

### *Generation of Investigative Leads*

- Possible age of material (e.g. tree rings)
- Distribution of plant types in an environment, such as for seasonal occurrence.

## Collection and Packaging

See General Trace Collection and Packaging Guidelines

### Clothing

If botanicals are suspected to be on clothing, do not attempt to remove them at the scene. Handle the clothing carefully so that the fragments are not lost or transferred to other items. Wrap each article of clothing in clean paper and package them in separate paper bags. Do not vacuum botanicals since many are very brittle.

### Vehicle (Exterior)

Large pieces of plant material caught under vehicles should be carefully removed and packaged into cardboard boxes to prevent damage.

### Shoes

Botanicals are often embedded in the soles and heels of shoes as one walks. Do not remove the particles from the shoes. Wrap the shoes in clean paper and place them into separate, clean paper bags.

Control or reference samples collected at the scene should be submitted separately. Avoid contamination.

### Pathways

Submit control samples from botanical sources observed along suspected paths leading to and from the crime scene, below windows at burglary scenes and at any area the suspect may have traveled through.

Sample whole specimens if possible including the roots, leaves, seeds, etc. You may decide to cut off small branches having specific vegetation. To collect easily transferred vegetation along a path, obtain a clean piece of white fabric about one foot square and drag it through the pathway above the ground. Small thorns, seeds, etc. will stick to it. Package the fabric in a paper envelope.

Living Specimens

Living specimens (e.g. leaves) that are collected need to be either submitted as soon as possible to the crime lab, or placed on clean paper between the pages of a heavy book to dry prior to submission to the lab. Please contact the lab if you have any questions.

## 10.0 FIREARMS EVIDENCE

### INTRODUCTION

Firearms evidence must be properly collected and handled in order to expedite and maximize the examination results.

### PRECAUTIONS

- **Always handle all evidence with gloves.**
- Do not pick up the firearm by placing a pencil or some other object in the barrel. Pick up by checkered portion of the grip.
- Handle the firearm carefully with the muzzle always pointing in a safe direction (or as safe as possible), even if the safety is on or the firearm is not cocked. The safety may be faulty or the trigger pull may be very light ("hair trigger"). Place the firearm into a box (preferred), paper bag, or envelope for transport back to the workstation.
- Knives/Firearms/Sharp items: should be placed in a new cardboard box and secured with plastic zip-ties.
- If the firearm is loaded, it must be unloaded before shipping to the crime laboratory. If, for some reason, the firearm cannot be unloaded, the submitting agency must call the crime laboratory and determine when and how to hand deliver the firearm to the laboratory.
- If the firearm is to be processed for latent fingerprints or DNA, caution should be exercised in order to prevent the destruction of prints or the contamination of potential DNA on the firearm. The submitting agency should call the crime laboratory for instructions prior to packaging and submitting evidence to the laboratory if there are questions regarding latent fingerprints or DNA.
- If a firearm or other metal object is recovered from fresh or salt water, it should be placed in a container of the water it was found in immediately (do not leave exposed to the air for any length of time). Immersion in that water will keep additional corrosive effects to a minimum.
- Do not clean the firearm before submitting.
- Do not fire the firearm before submitting.

**Proper labeling of evidence** includes the contents, source, date, time, item number (alpha-numeric as necessary), agency name and case number, and the name or initials of the collector.

- Secure weapons in new cardboard boxes with zip-ties or other method to prevent movement.
- Document and label the package appropriately (see [pages 15-17](#) of this manual).

### SIGNIFICANCE

The laboratory examination may reveal information about the firearm, ammunition, target object, and circumstances of the firearm incident. The examination may determine:

- Caliber of the fired ammunition.
- Type of firearm (by examining the recovered bullets and expended cartridge cases).
- Whether the recovered bullets and expended cartridges cases were fired from the recovered/submitted firearm.
- Any malfunctioning of a submitted firearm.

- Entrance and exit bullet holes in clothing.
- Approximate relative distance from muzzle to target.
- Any obliterated serial numbers.
- Reconstruction of events.

## **METHODS USED**

- Detailed examination of firearms including test firing and collection of fired bullets and cartridge cases.
- Microscopic comparisons between test fired bullets and cartridge cases, to each other, and then with submitted fired bullet and cartridge case evidence for specific firearm association.
- Microscopic examination of fired bullets for caliber determination, number of firearms used and the generation of a list of possible responsible firearms.
- Microscopic examination of fired cartridge cases to determine the number of firearms used.
- Polishing, acid etching and other methods applied to items with obliterated identifying markings or serial numbers.
- Visual and microscopic examination and chemical processing of items for the presence of gunshot residues, normally lead and gunpowder. These examinations will normally result in the determination of whether the muzzle of a firearm was in contact/near contact with a target, or at an intermediate or distant range from the target at the time of discharge.
- Review and examination of reports, images or other information to assist in the analysis of trajectories or in the reconstruction of events.

## **CONCLUSIONS**

Microscopic conclusions will normally be reported as:

- The identification of a specific firearm to fired bullet or cartridge case evidence.
- The elimination of a specific firearm as having fired a bullet or cartridge case evidence.
- The identification or elimination of a specific firearm to fired bullet or cartridge case evidence cannot be made (inconclusive).
- The submitted evidence is unsuitable for microscopic comparison.

## **OPERABILITY AND TEST FIRES**

The Crime Laboratory Firearms Section has developed a video for agencies to do their own test fires/operability testing. This video demonstrates how to test firearms, which will then allow the firearms scientists to focus on the critical forensic analysis in the laboratory. There are certain circumstances that might require submission of an operability case. Those circumstances include but are not limited to full auto conversions, damaged firearms, and other non-functional firearms. Trigger pull weights are not reported. The laboratory will also continue the operability testing on cases that require microscopic comparison. Turning this service back to our customer/user agencies allows us to focus on cases requiring our work in the laboratory. The video can be found on the FLSB website of the WSP [Firearms Operability Video](#).

## **OTHER EXAMINATIONS**

- Elemental analyses of gunshot residue for the presence of lead, barium and antimony are not conducted (ie. GSR on hands).
- The attempted association of a specific fired bullet to a specific discharged cartridge case is not normally conducted.
- Elemental analysis of lead bullets or bullet cores for identification to a lot or box of ammunition is not conducted.

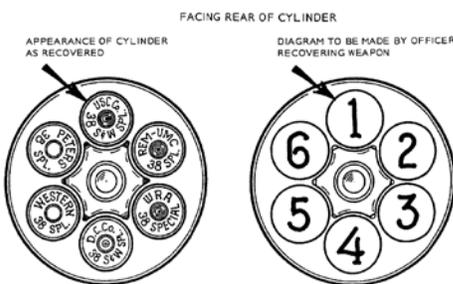
## COLLECTION AND PRESERVATION

- All items should be inventoried. Record the source, date, time, agency case number, item number, and description of the item. Descriptions of firearms should include the serial number (do not confuse with part numbers), make, model, caliber, and the condition when found (i.e., loaded or unloaded, cocked or uncocked, safety on or off, etc.).
- The area of recovery should be measured, sketched, and photographed, showing the positions of the item.
- Unload the firearm, if possible.
- Handle carefully in order to preserve trace evidence. Do not remove the trace evidence unless the entire object cannot be submitted. Before removing, describe the location of the trace evidence and photograph or sketch the evidence in place.

## UNLOADING A REVOLVER

- Place a line on the cylinder on each side of the top strap with a pencil or felt pen prior to opening or moving the cylinder. This will inform the examiner which chamber was at the top.
- While pointing the barrel downward, open the cylinder; before moving the cylinder or removing the cartridges, make a diagram of the cylinder. Number the chambers, starting at the top and going clockwise; note any cartridge in each chamber, whether the cartridge has been fired, and the headstamp information, indicating the manufacturer. See example:

## HEADSTAMP



Chamber #	Condition	Information
1	Fired	S&W
2	Fired	REM
3	Fired	WRA
4	Loaded	S&W
5	Loaded	WES
6	Loaded	PET

- Each cartridge or cartridge case that is removed should be placed in an individual container. The number of the chamber from which it was removed must be noted on the container.
- The firearm, cartridges and cartridge cases must be marked prior to packaging and shipping. A tag is a good method of marking the firearm.
- Unfired cartridges should be marked with an indelible felt tip pen along the case.
- Fired cartridge cases should be handled in a similar fashion as cartridge cases collected at a scene. Note: a mark made with a permanent marker may be removed during examination.
- **Never** mark the base of a fired or unfired cartridge.

## UNLOADING A SEMI-AUTOMATIC PISTOL

- Remove the magazine. Handle the magazine with care if it is to be processed for latent prints or DNA. Do not remove any cartridges. Mark the magazine. Package the magazine in a paper envelope, small box, etc. Seal and label the container. Submit with the firearm.
- Remove the live cartridges, if any, from the chamber. Mark the cartridge, indicating that it was removed from the chamber, place in a container, and seal and label the container. Submit with the firearm.
- Note the serial number of the firearm for proper identification.

## UNLOADING BLACK POWDER FIREARMS

### Percussion cap revolvers

- Remove the percussion caps from the cylinder and then remove the cylinder from the frame.
- Do not attempt to unload the individual chambers.

### Percussion cap rifles

- Remove the percussion cap. Do not attempt to unload the firearm.

### Flint Lock pistols and rifles

- Remove the flint and any powder in the flash pan. Do not attempt to unload the firearm.

Call the Crime Laboratory for shipping instructions.

## RECOVERED BULLETS, PROJECTILES, AND FRAGMENTS

- Each bullet or fragment recovered from the crime scene should be carefully packaged in an appropriate container, such as a small box (e.g., a pill box) or envelope (preferred). Seal and label the container.
- If a bullet is buried in a wall or other object, cut around the bullet. Remove the material containing the bullet. Do not probe the hole or try to dig out the bullet—it may damage the bullet. Place in a container, and seal and label the container.
- Do not touch recovered bullets with bare fingers. Possible traces of blood on the bullet could be contaminated by handling. Use a clean, unused pair of disposable gloves or pick up with clean tissue.
- Shot pellets should be collected and submitted in the same manner as bullets.
- Search for shot shell wads and shot cups whenever a shotgun is involved.
- Shot patterns should be measured, sketched, and photographed. If possible, the surface containing the shot pattern should be recovered.
- Bullets and fragments recovered at an autopsy should be carefully rinsed, dried, and placed in a small container or envelope. Seal and label the container. Do not seal bullets that are damp or wet in plastic containers as this may cause corrosion and damage the markings on the bullets.

## FIRED CARTRIDGE CASES AT SCENE

- Consider whether the items will be submitted for processing for fingerprints and/or DNA. Wear gloves to collect the evidence and prevent potential contamination.

- Each cartridge case should be placed in a small container or envelope. Make sure the packing is appropriately labeled. Do not mark the cartridge case on the base or on the side.

## **GUNSHOT RESIDUE FOR DISTANCE DETERMINATION**

If fired at close range, a firearm will discharge partially burned and unburned gunpowder particles onto the target surface. The appearance (i.e., the pattern and density of the particles) may assist in establishing the distance between the firearm and the target surface.

In addition to gunpowder particles, soot, vaporous lead, and small lead particles are also produced during the discharge of a firearm and these substances can be found on a target surface around a suspected bullet hole. These various products of the discharge of a firearm can be identified using chemical testing and the results of the various chemical tests can also be used to determine whether a firearm was in contact/near contact with a target, at an intermediate range from a target, or a distant range from a target at the time of discharge.

Drop-off distance is the approximate distance where the firearm and ammunition combination in the examination no longer deposits observable/detectable residues on the specific target material. Drop-off distance is normally indicative of the difference between intermediate range and distant range. If an approximate drop-off distance is reported, this wording will be added to the report:

“Testing to determine the approximate drop-off distance was conducted in a laboratory setting. A variety of scenario-based variables may have affected the evidence which could change the drop-off distance greater than any measurement uncertainty in performed laboratory tests.”

### **CAUTION:**

Chemical testing of clothing may have a detrimental effect on retesting and subsequent testing may not produce results similar to the original.

- If clothing is submitted, each article must be air-dried and packaged separately. Package the clothing in paper bags or wrap in brown paper. Do not package in plastic bags. Seal and label the containers, noting the contents.
- If the pattern is on skin, 1:1 color photographs of the wound and entire pattern should be submitted, before and after the wound area is cleaned. A scale or ruler must be included in the photographs. Close-up photos of the entry and exit wounds should be submitted as well as close-up photos of typical gunpowder particles in the pattern. Some of the particles should be picked off and folded in a piece of clean paper. The paper should be sealed, labeled, and placed in an envelope. Seal and label the envelope.
- The laboratory should be informed of the locations of the entry and exit wounds found on the body. Copies of autopsy or medical reports may be helpful in the course of the analysis and should be submitted to the laboratory.
- The suspect firearm and the same type of ammunition should be submitted. The gunpowder pattern on the proximity test target material may be compared to the patterns visible on or chemically developed on the submitted clothing.
- In the case of black powder firearms, the unknown factors of powder type and amount will be limiting factors in trying to establish distances between the firearm and target.

## **FIREARMS PARTS**

- It is important to collect any and all firearm parts found at the crime scene.
- It may be possible to reassemble the firearm for testing; a firearm type and manufacture may be identified.
- All of the collected parts may not be from the same firearm.
- The parts may be packaged in a box (preferred), a paper bag, an envelope, etc. Parts packaged in a box may be strapped down to prevent shifting during transport. The packaging should be marked with the appropriate identifying marks, such as agency case number, item number, and description of the item.

## **SERIAL NUMBER RESTORATION**

- The serial number on a firearm (as well as office equipment, bicycles, machinery, skis, etc.) may be obliterated to conceal ownership. Chemical processing can often restore the number. Do not wipe or abrade the surface.

## **SHIPPING FIREARMS AND RELATED EVIDENCE**

- Package the firearm in a suitable box. Firearms packaged in a box should be strapped down with zip ties to prevent shifting during transport. Mark the sealed box with the appropriate identifying marks, such as agency case number, evidence item number, and description of the item.
- When packaging semiautomatic pistols, place a zip-tie through the magazine well and out of the ejection port to render the firearm safe. Please do not put the zip-tie inside the barrel of the pistol as this may disturb trace evidence within the bore of the barrel.
- Live ammunition cannot be sent through the U.S. Postal Service. ([https://pe.usps.com/text/pub52/pub52c3\\_019.htm](https://pe.usps.com/text/pub52/pub52c3_019.htm)). Ship by United Parcel Service (UPS), Fed-Ex, or other common carrier.
- United Parcel Service requires that ammunition must be shipped separately from firearms; check with your preferred carrier for more information.
- All firearms must be unloaded before being shipped or hand-carried to the laboratory. If the firearm is difficult to unload, contact the crime laboratory for assistance. Secure the weapon in a new cardboard box with plastic ties to prevent movement.
- Handguns shipped via UPS must be shipped via Next Day Air. Please refer to the requirements of your normal carrier for more information.
- Long guns may be shipped via UPS ground.
- Other carriers may have rules regarding the shipping of firearms and ammunition. Please contact the carrier with specific questions regarding the shipping of this type of evidence.

<https://www.ups.com/us/en/help-center/packaging-and-supplies/special-care-shipments/firearms.page>

[http://images.fedex.com/us/services/pdf/Service\\_Guide\\_2017.pdf](http://images.fedex.com/us/services/pdf/Service_Guide_2017.pdf)

## 11.0 TOOL MARK EVIDENCE

### INTRODUCTION

A tool mark is a mark made by one object on the surface of another, softer object. Although these marks are generally made at the entry point of a burglary, various kinds of tool marks can be found elsewhere, such as fractured knife blades, cut marks on wire, abrasions left on a vehicle, cut marks on a padlock, and machine marks on a metallic surface.

### TYPES OF TOOL MARKS

- Some tool marks only show the basic shape of the tool. This type of tool mark lacks specific detail that can single out a particular tool; only the general shape and size of the tool can be determined—wood impressions are often of this type. Since wood will fracture or partially "spring" back, often only the general form and size of the tool can be determined.
- The tool mark that is of more value is the type that consists of striations (a series of narrow, fine grooves, some of which are microscopic) and indentations which show the individual characteristics of the tool. These marks can often lead to the identification of a particular tool.

### METHODS USED

The submission of a tool with a questioned/unknown tool mark will normally result in the making of test tool marks in an appropriate medium using the submitted tool. These test tool marks will be microscopically compared to each other and then compared with the questioned/unknown tool mark. Casting of the test tool marks may be required depending on the type of questioned/ unknown tool mark submitted.

### CONCLUSIONS

Microscopic comparisons will normally be reported as:

- The identification of the submitted tool to the questioned tool mark.
- The elimination of the submitted tool from the questioned tool mark.
- The identification or elimination of the submitted tool to the questioned tool mark cannot be determined (inconclusive).
- The submitted tool mark is unsuitable for microscopic comparison.

### OTHER EXAMINATIONS

Fracture matches and some impression/pattern evidence (i.e., footwear and tire tracks) are assigned to the Materials Analysis Unit.

### PRECAUTIONS

- Do not attempt to fit a suspected tool into the questioned mark. The tool mark may be damaged, the tool may be altered, and trace evidence may be lost or contaminated.

- In the case of cut wire type materials, mark the end of the wire type material cut by an agency representative during the retrieval of the evidence with paint, permanent marker, or wrap with tape, indicating this is a cut produced by a known tool. This provides information to the laboratory as to which end of the wire type material is to be compared with the suspected tool.
- Care must be taken to protect the suspected tool so that the face of the tool is not damaged, thus changing the tool mark it will produce. Protect the face of the tool with soft tissue paper.
- Handle the tool with gloves, as DNA might be recovered from a tool left at the scene.
- Protect any trace material on the face of the tool. Paint, metal particles, and other materials from a surface frequently adhere to the tool. The trace material can be compared with samples of the surface containing the tool mark.
- Samples of the surface adjacent to the tool mark must be taken. Later, when the suspect tool is recovered, trace materials on the tool can be compared to the samples taken at the scene. This information can be very valuable, particularly if the tool mark comparison is not definitive.

## **PRESERVATION OF TOOL MARKS**

- When possible, submit the object containing the tool mark. This may entail submitting a drawer, a metal screen door, or cutting out a portion of the object containing the tool mark.
- Close-up photos that include a scale must be made if the object containing the tool mark cannot be submitted. The film plane should be parallel to the tool mark. Oblique lighting will increase details visible in the photo.
- It is important that the tool mark be kept clean and dry. An exception is when a tool mark on a metal surface is subject to rusting. To retard rusting, coat the tool mark with a light film of oil.
- Casting of the tool mark may be done as a last resort. A cast will never completely replicate the details of the original tool mark. Suitable silicone rubber casting materials, such as Mikrosil or AccuTrans, can replicate a significant amount of the details in a tool mark. A formulation with a lesser degree of replication will cause a loss of the finer details in the tool mark and reduce the chances for a definite conclusion.
- Casting should be done by an experienced person. Improper casting may produce a worthless cast and damage the tool mark. **DO NOT PRACTICE ON THE EVIDENCE.**

## **TOOL FRAGMENTS**

- At crime scenes, burglary tools may break during the commission of the crime. Fragments of the broken tool may be found near the scene or even in the tool mark itself.
- Since these fragments may be very small, a flashlight held obliquely to the floor surface is helpful. A magnet may also be used to locate the fragments that contain iron.
- The recovered fragment may be fitted to the suspect's broken tool and constitute what is called a physical match. The physical match may identify the tool as the one used at the crime scene.

## 12.0 INTEGRATED BALLISTIC IDENTIFICATION SYSTEM (IBIS)/NATIONAL INTEGRATED BALLISTIC INFORMATION NETWORK (NIBIN) EVIDENCE

The Integrated Ballistics Identification System (IBIS)/National Integrated Ballistic Information Network (NIBIN) has greatly increased the ability of the Firearms Sections to identify incidents in which the same firearm was used. Often, IBIS/NIBIN can offer new leads in “dead end” cases and reduce the number of unsolved firearm cases.

IBIS/NIBIN is located in the Spokane, Tacoma and Seattle Crime Laboratories. Please submit IBIS/NIBIN entries to one of these laboratories. If there are any questions regarding submissions for IBIS/NIBIN entry, please contact the Firearms Section at one of these three labs that handle firearms evidence.

### METHODS USED

- Images of evidence and test fired cartridge cases will be entered into the NIBIN database for correlation with existing stored images. Automatic searches of NIBIN Region 15 (Washington, Idaho, Montana, Alaska and Northern California) occur when a cartridge case is entered into NIBIN. The cartridge case will also be searched any time a new cartridge case with appropriate characteristics is entered into NIBIN. Agencies can make a special request to have a cartridge case searched against any specific area that is outside of NIBIN Region 15, but is within the United States. The stored images of cartridge cases are maintained indefinitely.
- The submitting agency representative will be contacted regarding a potential association between submitted evidence items or test fired cartridge cases and existing database images.
- If needed for warrants, arrests, trial, etc., confirmation of potential associations between submitted evidence items or test fired cartridge cases and existing database images may be requested and the cartridge cases from the involved cases will be examined by a Firearms Examiner. The results of this examination will be communicated to the representatives of the agencies involved.

### SUBMISSIONS FOR NIBIN ENTRY

The following items may be submitted for IBIS/NIBIN entry:

- Recovered fired cartridge cases (evidence).
- Test fired cartridge cases – from primarily semiautomatic pistol and semiautomatic rifle firearm types.
- Please contact the Firearms Sections about any special situations or firearms questions related to IBIS/NIBIN entry.

The Crime Laboratory Division Firearms Section has developed a video for agencies to do their own firearms test fires/operability testing for NIBIN/IBIS entry. The video is entitled WSP Firearms Operability Testing Process and is located on the WSP website. ([Firearms Operability Video](#))

In an effort to increase customer service and provide quicker ways to submit items for IBIS/NIBIN, cartridge cases to be entered into IBIS/NIBIN will be handled in one of three ways:

- 1) They may be submitted as evidence and will be documented and handled as evidence. An RFLE needs to be submitted and chain of custody will be maintained.
- 2) They may be handled as walk-ins and remain in the possession of an agency representative who remains present during entry.
- 3) **FOR TEST FIRES ONLY:** They may be handled as non-evidence and delivered to the laboratory (e.g. by mail or in person) or created on-site by law enforcement personnel exclusively for IBIS/NIBIN entry, then placed in a location designated by the laboratory and entered into IBIS by any authorized IBIS/NIBIN operator. **THESE TEST FIRES WILL BE DESTROYED.**

Options 1 and 2 are recommended for evidence cartridge cases and option 3 is recommended for test fires. Since test fires under option 3 are destroyed, if an agency wants to retain test fires as evidence that the firearm is operable, it should create additional test fires for that purpose.

Please submit test fires in a test fire envelope or other appropriate packaging. The following information should be included on the test fire envelope/package for the IBIS/NIBIN entry:

- Agency name, case number, and contact
- Date seized
- Make/Model/Caliber/Serial Number/type (pistol, rifle, shotgun)
- If the firearm will be returned to a citizen or destroyed
- Any relevant scenario based information (location recovered etc.)

No evidence bullets or bullets produced during the test firing of firearms are currently being entered into the NIBIN database.

## 13.0 FORENSIC DOCUMENT EVIDENCE

The Washington State Patrol Questioned Document Section provides a wide variety of services related to documents involved in criminal investigations to our customer agencies. Those services include:

- **Handwriting and signature examinations** to identify writers and signers of documents that are related to criminal investigations.
- **Indented writing examination** to detect and decipher indented writing and determine the sources of anonymous or questioned documents.
- **Identification of the processes used to create documents**, including machine-generated documents, typewriting, photocopies, graphic arts processes, ink and paper examinations that are important in counterfeiting investigations.
- **Physical matches** to associate torn or cut documents with their sources.
- **Alterations** to genuine documents.
- In-house examination or referral to outside experts regarding **ink examination and dating, and differentiation of paper**.
- In-house examination or referral to outside experts regarding **document restoration**. This includes charred, soaked, torn, shredded, or otherwise damaged documents.

A document is defined as anything printed, written, typed, or reproduced that is relied upon to record or prove facts in an investigation. The role of documents is important in a society of contracts, wills, checks, and promissory notes, as well as threat and harassment notes, ransom notes, professional records and counterfeiting. The authenticity of these documents is often a critical issue to the resolution of a dispute or crime.

### STRUCTURE OF EXAMINATIONS

The typical **handwriting or signature examination** case has three parts:

- 1) The questioned items which are submitted by the investigator. It is always preferable to receive the original of all documents. Examinations can be made from copies; however, the clarity of the copy can affect the interpretation results of the evidence and reported conclusions.
- 2) Standards (known samples) of the suspect's writing.
- 3) Standards (known samples) of the victim's writing.

Handwriting and signature examinations might identify the writer of a check, letter, or questioned signature. Handwriting examinations might also determine that an individual is not the writer.

Writing of similar kind is needed for comparison (i.e. known handwriting to questioned handwriting, known hand printing to questioned hand printing, and known signatures to questioned signatures). Additionally, the same letter and word combinations are very important components for meaningful examinations and conclusions. *Handwriting examination must be performed prior to latent fingerprint analysis.*

**Indented writing examinations** can yield information regarding writing that appears on several sheets of paper below the source page. Indented writing is created by the transfer of the writing instrument's pressure track from the page upon which the writing occurs to the pages beneath. This is helpful in such cases as the investigation of anonymous notes. Such notes can be processed for indented writing, and they often

yield writing that occurred in a tablet several pages above the questioned note. Evidence recovered for indented writing examinations should be well-protected to prevent damage or additional indentation created during evidence processing.

**Identification of the processes used to create documents** can yield valuable information regarding the sources of documents and the determination of authenticity in counterfeiting cases. Examination of machine-generated documents can determine the type and, in certain cases, the specific machine used to create them. This includes typewriters, photocopiers, printers, facsimile machines, commercial graphic devices and systems. Especially important to counterfeiting cases is the submission of an authentic model of the document in question to which the suspected counterfeit can be compared. Examples include title certificates, checks, passports, and identification cards.

Among the most common cases involving **physical matches** is the microscopic association of pages to a source, such as a writing tablet or notebook. Careful attention to the preservation of the evidence will insure that the critical areas of the evidence do not sustain damage that might interfere with physical match determination.

**Alterations to genuine documents** are detectable using a variety of laboratory examination methods. These methods can determine data regarding alteration techniques and restoration of the original information that was altered.

**Ink examination and dating, and the differentiation of paper** are highly-specialized sub-disciplines of document examination. The Questioned Documents Section can provide services related to these examinations, and can also refer cases to experts outside our system who are imminently qualified to examine such evidence.

The Questioned Documents Section provides services in the highly specialized sub-discipline of **document restoration**. Some in-house services are available for such cases, and we can refer evidence to outside experts who specialize in various types of restoration work.

## **HANDLING AND SHIPPING OF EVIDENCE**

Questioned documents generally do not require special handling or procedures. However, document evidence should be protected from excessive handling. There are two notable exceptions that require special handling:

### **Indented writings**

Indented writing is the impression from the writing instrument that transfers to the sheets under the sheet containing the writing. These sheets should be protected from fingerprints, excessive handling, and additional impressions (e.g., do not write on the envelope after placing indented writing evidence inside).

Indented writing evidence must be examined before being processed for fingerprints. Fingerprint processing will destroy indented writing.

### **Charred documents**

Charred documents require hand delivery. They should be placed in a box lined with cotton. Do not attempt to separate the pages. The Spokane Crime Lab should be consulted before collecting and submitting.

## SUBMISSION

Separate documents into at least two groups and submit in separate envelopes, Questioned Documents and Known Documents. If you have numerous writers, known documents should additionally be separated into groups by writers (K1, K2...). Each item of evidence must have the case number and a unique identifier. Evidence should be sealed with tape, with initials and date across the taped seal. If you have questions at any time, please contact the QD Section.

**Questioned Documents:** Documents that are suspected of being forged, altered, counterfeit, etc.

- Place the questioned items together in a labeled envelope and seal. If you suspect multiple writers among the questioned documents, group accordingly and submit in separate envelopes.
- Do not write on the documents as impression writing may be recovered. If indented writing examinations are requested, sandwich between cardboard/cardstock and place in envelope.
- Do not fold or alter the documents. Keep them in the original state.
- Wear gloves and take appropriate measures to preserve fingerprint evidence. Please submit all questioned documents to the Questioned Document Section before processing for latent prints.

**Known Documents:** Documents containing handwriting from a known source and will be used for comparison to the questioned writing.

- Place the known documents from each writer in separate labeled envelopes and seal.
- Obtain known writing samples from victim(s).
- Submit collected writings, those writings that are not requested. This type of known writing is most valuable in determining authorship.

The known documents must be of the same style of writing as the questioned items (i.e., hand printing to hand printing, handwriting to handwriting).

**Requested standards** are obtained through use of Crime Lab Division *Handwriting Exemplar Packet*. The exemplar will provide sufficient writing for examination. All four pages of the exemplar are necessary to obtain a representative sample of the subject's writing. Fully one-half of the exemplar is designed for the investigator to dictate to the subject the various signatures, amounts, numerals, phrases, and other writings specific to the case. Check samples are also included in the exemplar packet for check cases. Additional paper may also be used along with the exemplar packet.

You must be familiar with the questioned writing in order to dictate to the subject the correct questioned names, amounts, dates, payees, phrases, or signatures.

- Each questioned signature, name, word, etc., should be dictated to the subject 15 to 20 times.
- The various names, dates, questioned entries, etc., should be dictated in a random manner (e.g., "John Smith, four hundred, John, Smithsonian, Smith and Johnson," rather than "John Smith" 20 consecutive times).
- The exemplar should be filled out by the subject with a black ink ballpoint pen. Do not use a fiber tip or rolling marker pen.
- The Questioned Documents Section Handwriting Exemplar Form can be obtained by contacting the Spokane Crime Laboratory at 509-625-5401.
- Handwriting exemplars must be packaged, labeled, and treated as evidence when submitted to the crime laboratory.

**Collected** standards are any writings that will be accepted in court as the genuine writing of the subject. Cancelled checks, business records, court documents, payroll checks, letters, and diaries are examples of collected standards. Contact the QD Section for ideas of collected standards.

There are some cases where the standard exemplar is not the best sample. The questioned item may not be typical of the normal writing situation. The investigator should obtain writing standards under circumstances similar to those of the questioned writings. For example,

- Graffiti on a wall: Have the subject write on a piece of paper taped to the wall at a similar height/position.
- Anonymous writing on unlined paper: Have the subject write dictated, verbatim samples on unlined paper.

If taking photographs of threats or graffiti, please take high quality, properly exposed, correctly-focused photos made with the camera perpendicular to the writing surface. If possible use a tripod and NO flash. More than one photo is recommended. If it is a digital photo, then please record original files on a CD or prints on photo-quality paper.

For questions regarding this information or to discuss the specific aspects of your case please contact the Questioned Documents Section at the Spokane Crime Laboratory.

Washington State Patrol  
Spokane Crime Laboratory  
Questioned Documents Section  
580 W 7<sup>th</sup> St  
Cheney, WA 99004  
(509) 625-5401

### **Frequently Asked Questions**

**Do the forensic document examiners (FDE) administer the exemplars?** No, we do not. We are available if you have questions, but we do not administer the exemplars. We leave that to the investigator.

**Can we send the documents to you by fax?** No, we cannot accept documents submitted via fax for examination requests.

**Can we send the documents to you by email?** Please contact the Questioned Documents Section prior to submitting requests via email.

**Can a FDE determine gender, age, ethnicity, personality, or mental state from writing?** No.

## 14.0 LATENT PRINTS EVIDENCE

### INTRODUCTION

Friction ridge impressions (commonly referred to as latent prints) are a widely recognized means of personal identification. Most crime scene evidence has the potential to contain latent prints. One should assume that latent prints are present on all objects handled. Process or collect these pieces of evidence accordingly. Latent prints are susceptible to destruction and may be destroyed simply by coming into contact with other items of evidence, packing materials, or a package container. Proper collection, handling, and packaging of the evidence is critical.

### DEFINITIONS

**Alternate Light Source:** Any light source, other than a laser, used to excite luminescence of latent prints, body fluids, or other items. These systems usually use various filters in conjunction with certain powders or chemicals to cause latent prints to fluoresce.

**Automated Biometric Identification System (ABIS):** A computer system (previously known as the Automated Fingerprint Identification System) that allows scientists to store, and search finger or palm print images in a database.

**Exclusion:** The opinion of an examiner that there is sufficient quality and quantity of detail in disagreement to conclude that a known subject could not be the source of an impression, or that two areas of friction ridge impressions did not originate from the same source.

**Exemplars** (also referred to as known prints or elimination prints): The deliberate recording – electronically, by ink, or by other medium – of the friction ridge detail of an individual associated with a known or claimed identity. Recording complete exemplars provides the laboratory with the greatest opportunity to conduct conclusive comparisons.

**Identification:** The opinion of an examiner that there is sufficient quality and quantity of detail in agreement to conclude that two impressions originated from the same source.

**Inconclusive:** The determination by an examiner that there is neither sufficient agreement to individualize, nor sufficient disagreement to exclude. A reason for an inconclusive result will be included in the report. Better quality or more complete exemplars may be needed for a conclusive result.

**Latent Print:** A transferred impression of friction ridge detail that may not be readily visible.

**Next Generation Identification (NGI):** The FBI's national AFIS (previously known as IAFIS or the Integrated Automated Fingerprint Identification System).

### CAPABILITIES AND SERVICES

The primary functions of the Latent Prints section is to examine and process items of evidence for friction ridge impressions, determine if the impressions are suitable to be designated for comparison, compare

unknown impressions to known prints, and search unknown impressions in the available databases. The results of all examinations will be compiled in a case report which is returned to the requestor or other interested parties.

The Latent Prints section typically designates for comparison only those impressions potentially suitable for identification. Impressions suitable for exclusion only will not generally be considered, except at the scientists's discretion or upon a specific request by the submitting agency.

The Washington State Patrol (WSP) contracts with the Western Identification Network (WIN), to operate and maintain the Automated Biometric Identification System software and database. WIN is a consortium of several western states (Washington, Oregon, Idaho, Nevada, Utah, Wyoming, Montana, and Alaska), referred to as central sites, sharing a common ABIS database. When searching a print in the ABIS database, the WSP can search Washington records alone, each central site member, some combination of central site members, or all central site members. In addition, access may be provided to other national, state, or local state databases through the WIN network (e.g. California DOJ and the FBI's NGI).

Latent impressions which meet the quality requirements to be searched in the WIN ABIS are searched against databases of known tenprint or palm print exemplars. Impressions which are not identified as a result of the search are routinely registered into an unidentified latent prints database. As new exemplars are submitted to WIN or NGI, they are automatically searched against all registered latents in the respective unidentified latent prints database. When a potential match is generated, the original submitting agency is notified and a new request may be opened to compare the generated subject to the unidentified latents from the original request.

Retention of unidentified impressions in the WIN database is limited by an expiration date linked to the offense. When multiple offenses are listed, the offense with the longer statute of limitations is generally chosen. When the expiration date is reached, the impression is removed from the database and is no longer subject to automated searches.

If a new search of a registered latent is desired, a new request may be submitted.

The identification of a source of impression is considered a significant result. Further comparisons of the impression to listed subjects are not likely to be conducted, and any exclusions of the source may be omitted from the laboratory report.

Examinations may be limited based on case circumstances. Those limitations will be described in the laboratory report and the remaining examinations can be completed upon request.

## **COLLECTION**

Evidence should be examined thoroughly for latent prints prior to collection. All visible impressions should be photographed (see below for photography instructions).

Latent prints developed by powder processing methods should be lifted and submitted to the laboratory. If the lift process may pose a challenge, the latent prints should be photographed prior to lifting. Lift tape may be placed over the impression, left in place without lifting, and the item submitted to the laboratory for examination.

Latent lift cards should be documented with the location and orientation of the latent print. Please provide written information and a simple sketch of the object to describe the location from where the lift

was made. Small directional arrows are helpful in orienting the placement of a latent print. Written information should include the date, case number, crime scene location, the object from which the lift is made, and name of person making the lift. If any of the officer's prints appear on the lift tape after lifting, those impressions should be crossed out and initialed (figures 1 and 2).



**Figure 1**

Date	Crime	Case No.	— Sketch and/or Remarks —
6/30/15	Burg.	1531234	
Victim			
Chip Chuck			
Address of Incident			
18A Big Tree Ln			
Location of Latent Prints Lifted			
Door window			
Prints Lifted by		ID No.	
Diego Garcia		XXX	
Lightning Powder • (800) 347-1200 www.lightningpowder.com			
Re-Order #1-2501			

**Figure 2**

If any evidence is to be submitted for processing with chemicals, the officer should refrain from the use of powder processing as powders could interfere with chemical processing. Any processing completed on

an object prior to submission should be noted on the Request for Laboratory Examination form. This is especially important if an item has been fumed with superglue (cyanoacrylate).

Friction ridge impressions should be photographed using a high resolution digital SLR camera. The largest file format available should be used and images should be captured in a loss-less file format such as .tiff or RAW. The camera should be perpendicular (at a right angle) to the latent print so that the camera sensor is parallel to the impression. Every attempt should be made to fill the frame with the impression to ensure that the maximum amount of detail is recorded and that the image is captured at a minimum of 1000ppi. A scale should be placed next to the print and on the same plane for the photograph. The scale is important to allow the image to be sized 1:1 for comparison and possible search of the ABIS system. The object or area containing the impression should also be photographed to provide the context or orientation of the impression.

Digital images should be copied to digital media for submission to the laboratory.

### **Known Exemplars**

The requestor should take inked prints from all persons known to have legitimate access to the evidence (elimination prints) to allow for comparison against any latent prints recovered. All tenprint cards and pages included in a set of exemplars should be labeled with the identifying information of the subject as well as the date and initials of the individual recording the exemplars. These exemplars should be treated like items of evidence and should be packaged accordingly. Alternatively, if individuals already have known prints on file, list their name, date of birth, and SID number on the laboratory request. Latent prints recovered from items of evidence often include palms or prints made from the second or third joint areas of the fingers. For this reason it is always best to obtain comprehensive known prints (major case prints) for comparison.

A properly inked and rolled tenprint card should have all ten fingers and thumbs rolled nail to nail with minimal smears, along with plain (or flat) impressions at the bottom of the card.

In addition, each finger and thumb should have the center, both sides, and extreme tips inked and recorded (figure 3).



**Figure 3**

The palms should be inked from the tips of the fingers to the base of the wrist or the wrist crease. The outside of the palm should also be inked and recorded separately which is known as the 'writer's palm' (figure 4).



**Figure 4**

### **Post Mortem Prints**

In homicide and death investigation cases, the agency should make every effort to obtain a complete and comprehensive record of all friction ridge detail. The laboratory should be contacted if assistance is needed.

If it becomes necessary to remove the hands or fingers from the body, notify the laboratory in advance of

its intent to deliver the body parts in person. **Do not send body parts through the mail or other carrier services.**

## HANDLING AND PACKAGING

**REMINDER: Prohibited items include: Explosives, flammable liquids, razor blades, and syringes with needles or needles sheared or broken.**

- Non-porous items (glass, aluminum cans, plastic bottles) should be packaged in containers to limit movement while in transit. Items should be submitted in separate containers if possible. If multiple items are submitted in the same container ensure the separate items will not contaminate others (leaking or cross contamination of biological substances). Items should be handled as little as possible and in a manner to avoid those areas that would be handled normally. Unnecessary layers of packaging and handling can easily damage latent impressions.
- **Do not pack the sealed evidence container with “filler” material (shredded paper, foam peanuts); these materials risk rubbing away any latent impressions.**
- It is strongly recommended that knives, firearms, or other sharp items be packaged in cardboard boxes and secured with plastic zip-ties. Make note on the Request for Laboratory Examination of any potential hazards present.
- Porous items (paper, cardboard) may be packaged in an envelope. Multiple porous items may be packaged in the same container. Handling of these items should be kept to a minimum even with gloves as glove marks can interfere with the development of latent impressions.
- Any wet items should be completely air-dried prior to submission.
- Adhesive tape, if possible, should be placed onto a sheet protector or a sheet of heavy plastic. Avoid "wadding" the tape. Do not package tape in paper containers.
- Latent print lift cards should be packaged in a properly sealed envelope or plastic bag of an appropriate size.
- Multiple lift cards may be submitted in the same packaging provided that each lift card is labeled with a unique identifying number and that the total number of lift cards contained is reflected on the outer packaging.
- Friction ridge exemplars should be packaged in a properly sealed envelope or plastic bag of an appropriate size.
- Latent lift cards collected at clandestine laboratories must be properly packaged to protect the health and safety of Crime Laboratory personnel. If latent print lift cards from clandestine laboratories are not packaged properly the evidence cannot be accepted. To package the lift cards properly, seal each latent lift card individually in plastic bags that have not been exposed to any potential contamination.
  - Note: When latent print processing is requested on items recovered from a suspected clandestine laboratory such as glassware, plastic baggies, and chemical containers, please call the WSP-SWAT team for assistance. Crime Laboratory personnel will not process evidence from clandestine laboratory “hot zones” for latent prints due to safety considerations for laboratory personnel.

# Section Two

## HIGH TECH CRIMES UNIT

# 1.0 DIGITAL EVIDENCE

## INTRODUCTION

The Washington State Patrol's High Tech Crime Unit (HTCU) provides city, county, state, and federal law enforcement agencies with digital forensic technical support and training; and in accordance with established practices and standards of digital forensics processing, recover evidence that may exist on computer hard drives, cell phones and other digital media for use in related criminal and internal investigations.

## ABOUT THE HIGH TECH CRIME UNIT

HTCU is a full service digital evidence retrieval and analysis unit. HTCU detectives are experienced professional investigators that can retrieve evidence without damaging or altering the original data. The data can be recovered from deleted or damaged file structures.

HTCU can provide an independent, impartial, and secure investigation while revealing and preserving important evidence, which agencies use to ensure an appropriate outcome to important digital criminal investigations.

## HTCU SERVICES

Recovery of Cell Phone contents including (varies based on phone model and carrier):

<b>Decoded Data</b>	<b>GPS</b>	<b>Applications</b>	<b>Internet Browser</b>
Call Logs	Home Location	WhatsApp – Chat	History
Voicemails	Favorites	Viber	Cookies
Contact Lists	Recently found locations	Fring	Bookmarks
Locations (Wi-Fi, cell towers, and GPS fixes)	Last Journey	AIM	
Images	Last Fix	TextNow	
Video Files		TextFree	
Text messages (SMS)		Google+	
Multimedia messages (MMS)		Skype	
Emails		Tiger text	
Notes		Facebook	
Installed Applications		Motion X	
User Dictionary			
Calendar			
Bluetooth Device			
Pairing History			
Chats			
GeoTag Information			
Deleted Data			

Recovery of data from computer hard drives and other digital media (cameras, SD cards, thumb drives, CDs/DVDs, etc.) including:

- Recovery of e-mail files
- Recovery of deleted files
- Recovery of Internet History files
- Recovery of financial records
- Recovery of photo/video files
- Recovery of text documents

## **TYPICAL INVESTIGATIONS**

Internet Crimes against Children, Homicide, Rape, Child Abuse, Financial Crimes, and Narcotics.

### HANDLING AND SHIPPING OF EVIDENCE

#### **HANDLING**

No attempt should be made to power up a computer taken as evidence, as this may alter/destroy information stored on the hard drive.

Hard Drives should be submitted as found when seized, i.e. if in a desktop tower the entire tower should be submitted.

External hard drives, GPS units, digital cameras and other external devices should be submitted with power and connection cables.

Batteries should be removed from laptops and submitted with the computer and the power supply.

Batteries should be removed from cell phones prior to being packaged and should be submitted with power and connection cables.

If any known biohazard is present the outside of the package will require a "BIOHAZARD" label or markings.

#### **SHIPPING**

Evidence should be shipped via UPS, Fed Ex, Certified Mail or delivered in person. When shipping digital media all items should be packaged properly with plenty of packing material. All items should include a Lab Request Form and a copy of the signed search warrant and affidavit or a signed consent to search form.

The address for shipping is:

Washington State Patrol/High Tech Crime Unit  
106 11<sup>th</sup> Ave. SW, Suite 4100  
Olympia, WA 98501

For questions or if delivering in person please call: 360-704-4242.

# Section Three

## TOXICOLOGY LABORATORY DIVISION

## 1.0 TOXICOLOGY LABORATORY DIVISION

2203 Airport Way S., Ste 360  
Seattle WA 98134  
Telephone: (206) 262-6100  
FAX: (206) 262-6145

Email: [toxlab@wsp.wa.gov](mailto:toxlab@wsp.wa.gov)

Website: <http://www.wsp.wa.gov/forensics/toxicology.htm>

## **PREFACE**

In July 1999, the Washington State Toxicology Laboratory became a division within the newly formed Forensic Laboratory Services Bureau of the Washington State Patrol. The Washington State Patrol Crime Laboratory formed another division within the same bureau. It is important the user recognize that each Laboratory Division performs distinct services for the State of Washington and that the appropriate guidelines and requests forms be used for each.

The Toxicology Laboratory Division handbook is organized to provide the following:

- A description of services provided by the Toxicology Laboratory
- General guidelines for the collection, preservation, and packaging of physical evidence
- The procedure for submitting physical evidence

It is not possible for any handbook to be comprehensive for every type of case. The Toxicology Laboratory staff are always available to advise you on any specific or unusual case. You can reach a toxicologist to answer any questions you have at (206) 262-6100.

## INTRODUCTION

The Toxicology Laboratory, located in Seattle, provides toxicological services to all medical examiners, coroners and law enforcement agencies within the state. Forensic toxicology answers the question: “Did drug or alcohol use contribute to or cause an individual’s death or suspected intoxication?” In support of that effort, the Toxicology Laboratory provides the following services:

- Performs toxicological examinations of blood, urine and/or other tissues collected during a death investigation; or from living individuals who were either the victim of a crime or were suspected of committing a crime in which drugs and/or alcohol may have played a role. This includes suspected driving under the influence (DUI) of alcohol and/or drugs, victims of suspected drug facilitated sexual assault (DFSA), and miscellaneous drug related incidents or crimes. The Toxicology Laboratory reserves the right to decide which method(s) to use in the detection of alcohol and drugs in submitted casework.
- Provides consultation and interpretation for medical examiners and coroners on the results of toxicology analyses in death investigation cases.
- Provides consultation and interpretation for law enforcement agencies and attorneys on the results of toxicology analyses in driving-related cases.
- Provides expert testimony in court trials, hearings, and depositions.

## SAMPLE SUBMISSION

The Toxicology Laboratory in Seattle provides forensic toxicology services for all law enforcement agencies, coroners and medical examiners within the State of Washington. The laboratory analyzes blood, urine, and other biological tissues or fluids for the presence of alcohol and/or drugs.

### Sample Collection Kits

The Toxicology Laboratory may provide user agencies with kits for sample collection. To order any materials, please call or email the laboratory.

NEVER submit the vacutainer collection needle or any other needle with the samples. Asking the nurse or phlebotomist to resheath the needle is subjecting him/her person to unnecessary risks and is against OSHA regulations. The Toxicology Laboratory will not accept any case that includes a needle or a syringe with the needle attached. Similarly, do not submit the betadine wipes or gauze – these are discarded upon receipt.

*NOTE: The cutting or shearing of a needle from a syringe is prohibited by federal and state regulations. [WAC 296-823-14010]*

### Collection and Submission to the Laboratory

Tubes should be completely filled, whenever possible. Submitting partially filled tubes, or using smaller tubes, may result in partial or incomplete testing. Each assay performed requires a minimum volume of blood and the laboratory may not be able to confirm the presence of drugs if insufficient sample is submitted. In driving-related cases, the laboratory tries to reserve the second tube for the defense if

independent analysis is requested.

All samples should be labeled with the subject's name and/or agency case number. It is important that, when labeling the blood tubes, the printing on the manufacturer's label should not be covered. In addition, the Toxicology Laboratory maintains quality assurance certificates from the manufacturer for specific lot numbers and, if tubes from another source are used, the laboratory may not be able to provide a certificate.

Not only should the proper collection tube be used but it should also be **inverted** after collection to dissolve the container additives within the sample. The additives serve to preserve the sample and to prevent its coagulation; both being requirements under Washington Administrative Code 448-14-020: (<http://apps.leg.wa.gov/wac/default.aspx?cite=448-14-020>).

Once the sample has been collected, place the evidence tape over the top of the tubes/containers. The initials or other identification of the person creating the seal should be placed on the seal or across the seal onto the container.

If urine is collected, please ensure the urine cup cap is sealed correctly to prevent leaking in shipment. This is a commonly encountered problem and may lead to the loss of the entire sample. **Do not forget to label the cup with the subject's name.**

Complete the appropriate Toxicology Laboratory Request for Analysis form and submit along with the samples. **Do not submit the Crime Lab RFLE forms.** The more information you provide in your request, the more thorough analysis the laboratory can perform. A telephone number and/or email address should be provided should any question arise during analysis. Please note the column on the far right-hand side of the Request for Analysis form is for *laboratory use only*. If the sample is a DRE, a copy of the DRE Face Sheet should also be sent with the completed request form. Current forms are available online at: <http://www.wsp.wa.gov/forensics/toxicology.htm>.

**Verify that the subject's name on the request form and the samples are the same.** When there is a discrepancy between the request form and the sample tubes, it is the laboratory's policy to use the name on the sample tubes.

The request form should be packaged on the outside of the box containing evidence. This allows the Property and Evidence Custodian to access the request form without handling the specimen itself. All specimens should be refrigerated until sent. Specimens may be shipped to the laboratory or hand delivered Monday through Friday between 7:30 am and 1:00 pm.

## CASE TYPES

There are four types of cases typically submitted to the Toxicology Laboratory: Driving Under The Influence (DUI)/Drug Recognition Expert (DRE) cases; Death Investigation cases; Drug Facilitated Sexual Assault (DFSA) cases; and Drug Investigation cases. Use the appropriate form for each type of case: <http://www.wsp.wa.gov/forensics/toxicology.htm>. If you have questions about which form to use, contact our office.

### Driving Under the Influence (DUI)/Drug Recognition Expert (DRE)

Only blood/ breath alcohol and blood THC test results are admissible in court as *per se* evidence of intoxication, so when alcohol is suspected and a legal breath test is not conducted, obtain a blood sample and not urine.

### Death Investigation

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For deceased subjects, blood is typically the most valuable sample for postmortem toxicological testing. Since peripheral blood is less susceptible to postmortem changes, it is the specimen of choice and is considered the most reliable for interpretation of toxicological testing.

Where available, vitreous humor fluid should be routinely collected (all available fluid should be collected, typically 3-5 mL in each eyeball). It is more than 98% water, and any drugs present in the blood will eventually equilibrate in the vitreous. Vitreous is a particularly useful sample for testing for alcohol to distinguish between postmortem production of alcohol and alcohol ingestion, since the eye as an enclosed organ is generally more resilient to microorganism infestation than other tissues.

Liver, cerebrospinal fluid, gastric contents, other tissues and maggots may also be useful specimens for analysis depending upon the circumstances of the case.

Whenever a death may involve unusual circumstances or unusual drug(s), it is advisable to contact the Toxicology Laboratory staff for guidance in sample collection.

### Drug Facilitated Sexual Assault (DFSA)

Urine is typically the specimen of choice for drug facilitated sexual assaults because it provides the longest window of detection. For the best toxicological interpretation, a urine specimen should be obtained within 96 hours of incident.

Blood should additionally be collected if the patient presents within 24 hours of the alleged incident or if the patient appears sedated and/or intoxicated.

Ensure all specimen containers are properly documented and labeled with the victim's name, date and time of collection, and approximate time after the alleged assault.

### Drug Investigation

Non-driving related cases on living subjects where drugs are suspected (i.e. homicide suspect) are considered Drug Investigations. It is important to collect two full gray-top vacutainer tubes of blood whenever possible as drug testing consumes more blood than alcohol testing.

If there is a significant delay between the incident and the blood collection (> 2 hours), a urine specimen may also be useful in Drug Investigation cases. In general, blood provides better evidence of drug influence than urine, but drugs will be detected for a longer time in urine than blood.

## **TOXICOLOGY LABORATORY FORMS**

Current Toxicology Laboratory Request for Analysis forms can be obtained electronically at <http://www.wsp.wa.gov/forensics/toxicology.htm> or by emailing your request to [toxlab@wsp.wa.gov](mailto:toxlab@wsp.wa.gov). DO NOT SUBMIT CRIME LAB FORMS. Please note that the column on the right hand side of the form is for "Laboratory Use Only". Forms include:

Driving Under the Influence/DRE – Request for Analysis

Death Investigation – Request for Analysis

Drug Facilitated Sexual Assault – Request for Analysis

L.C.B/Drug Investigation – Request for Analysis

## **TOXICOLOGY LABORATORY DRUGS SCREENED**

A list of drugs the laboratory screens for and their drug class can also be found at <http://www.wsp.wa.gov/forensics/toxicology.htm> This list may change as screening methods develop.