



LABORATORY USER'S GUIDE

July 2017

Alaska Scientific Crime Detection Laboratory

Laboratory User's Guide

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The objective of this Guide is to make practical information concerning how the Alaska Scientific Crime Detection Laboratory can assist in criminal investigations, and procedures for the collection, preservation, and submission of physical evidence, available to law enforcement personnel.

While every effort has been made to ensure its accuracy, it is inevitable that with time some changes will occur. It is, therefore, recommended that the user of this Guide keep abreast of those changes.

The Guide is not intended to cover all situations or to supersede agency policies or procedures. The Laboratory intends to make periodic updates and changes to this Guide as new methods are developed.

Should any questions arise, individuals are encouraged to contact the Laboratory.

It is the hope of the Laboratory that this Guide will promote the maximum use of physical evidence and encourage greater use of the services of the Laboratory.

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GENERAL SUBMISSION OF EVIDENCE

The "REQUEST FOR LABORATORY SERVICE" (RLS) form is designed to permit personnel in the laboratory to serve you in a more efficient and orderly fashion.

This form provides an evidence receipt for the submitter and evidence work sheets to remain with the evidence while in the laboratory.

The form should be completed by the requestor prior to being hand-carried or mailed to the laboratory with the evidence. With this procedure the person receiving the evidence will be able to process the request much more rapidly. When executing this form, use the fillable document located on the crime laboratory's website (<http://dps.alaska.gov/CrimeLab/docs/RLS.pdf>). The request form is a communication device and should be used to clearly communicate the examinations and comparisons desired.

Alaska Scientific Crime Detection Laboratory 4805 Dr. Martin Luther King Jr. Ave. Anchorage, AK 99507		Reset Form		Print Form	
REQUEST FOR LABORATORY SERVICES					
			Agency Case Number		
			Agency Name		
			Address		
			City	State AK	Zip Code
Case Agent Contact & Scientific Examination Report Distribution Information					
Full Name (First M. Last)		Telephone	Email		
Additional Report Email			Additional Report Email		
Case Related Individuals: Victim (V), Suspect (S), Elimination (E), Other (O) Add Individual					
Individual (First M. Last)	DOB (mm/dd/yyyy)	Sex	APSIN #	Type	Related Evidence Items (list items #'s)
Case Information Relevant to Scientific Analysis and Sample Selection					
Offense(s) and Date of Offense(s) Add Offense(s)					
Offense	Date (mm/dd/yyyy)	Offense	Date (mm/dd/yyyy)		
Is this case an alleged Sexual Assault? (Check if Yes, leave unchecked if No) <input type="checkbox"/>					
Evidence (Select an analysis category for each evidence item)					
Evidence Item #	Description				
<input type="checkbox"/> Alcohol	<input type="checkbox"/> Latent Prints	<input type="checkbox"/> Forensic Biology (DNA)			
<input type="checkbox"/> Toxicology (Drugs in blood, driving offenses only)	<input type="checkbox"/> Footwear Impressions	<input type="checkbox"/> Sexual Assault Kit Storage - No analysis			
<input type="checkbox"/> Controlled Substances	<input type="checkbox"/> Firearm/Toolmark				
	<input type="checkbox"/> Serial Number Restoration				
Add Evidence					
Is additional evidence of investigative value available for analysis? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Chain of Custody for Listed Evidence					
Received From		Date	To		

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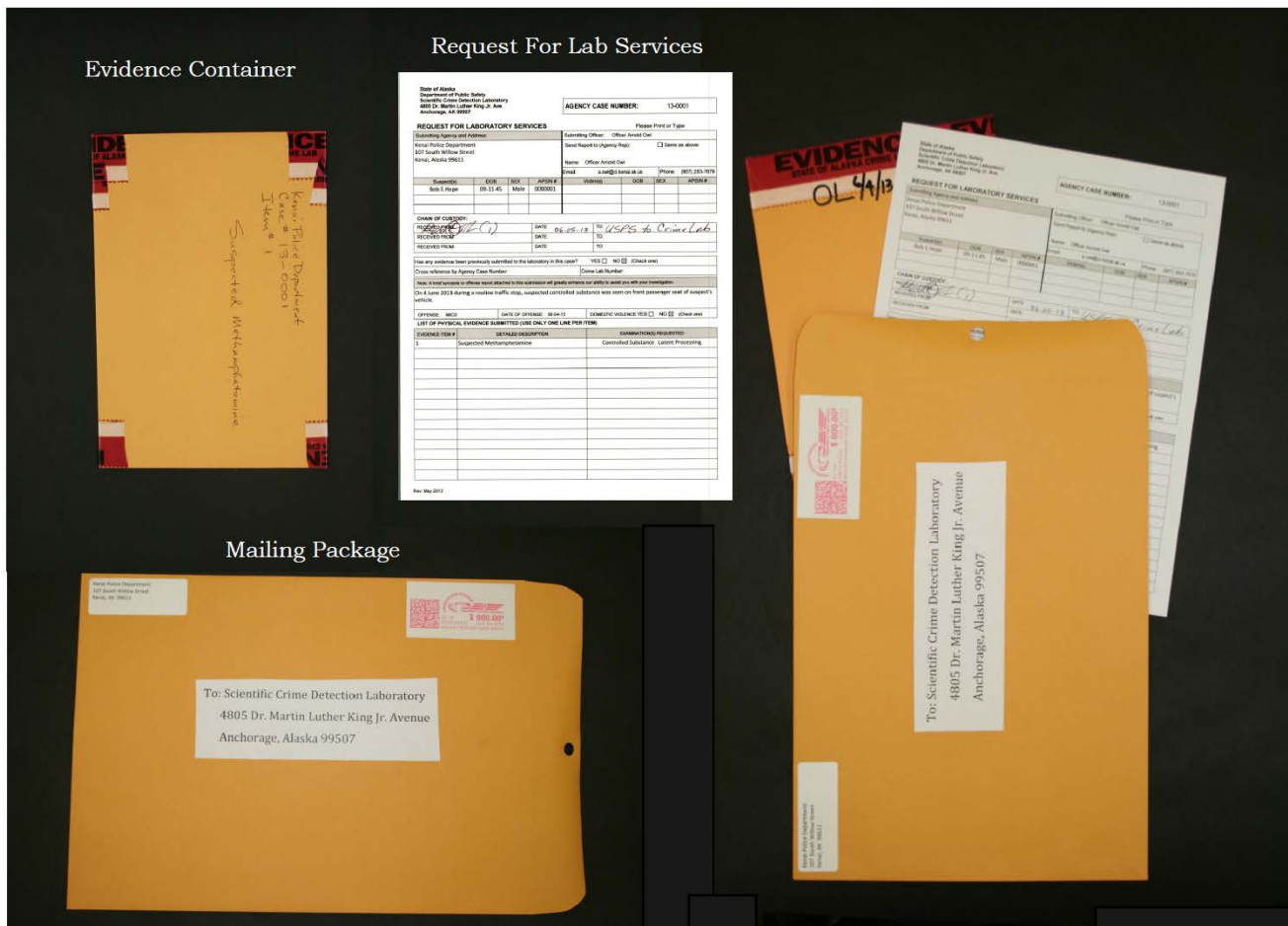
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EVIDENCE MAILING INSTRUCTIONS

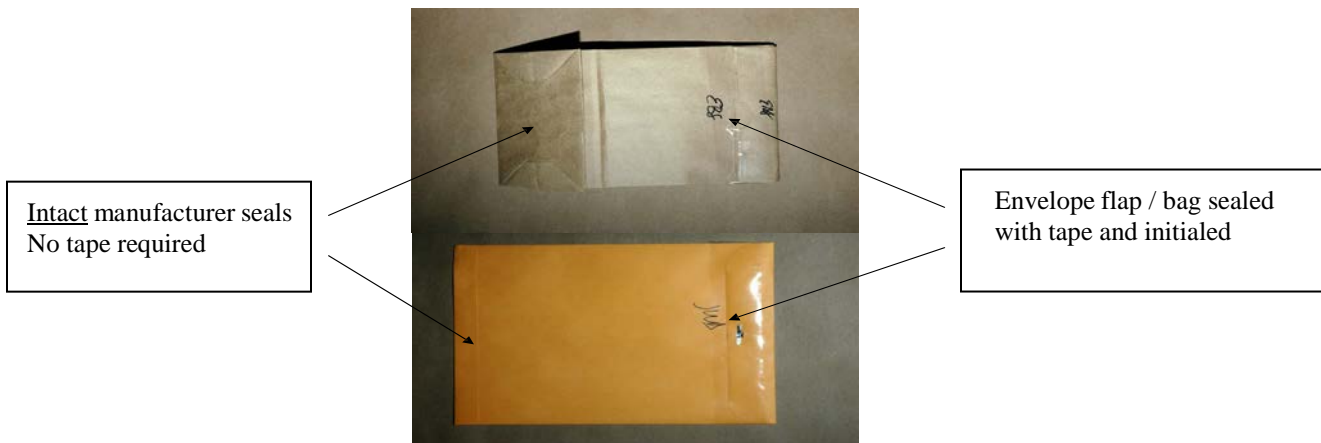
When using the U. S. Postal Service for transmittal of evidence, it is necessary to maintain the proper chain-of-custody. To maintain reasonable control over evidence transmitted in this manner, evidence should be mailed by certified or registered mail with a return receipt requested (or equivalent shipping method). This method of shipment allows the sender to maintain a written record of the various stages of transmittal. Use a street or route number in your return address so that evidence may be returned to you by USPS or other shipping agent with a signature of receipt required.

Package item(s) of evidence in a sealed, labeled and initialed evidence container(s). Complete the RLS. Place the evidence container and the RLS in a larger envelope or box for mailing.



SUBMISSION REMINDERS

- When mailing evidence, place the RLS inside the mailing container but outside of the evidence container (see previous page for instructions.)
- Place a phone number that you can be reached at on the submission form. This will allow the analyst to contact you if there is a question. Include the email address for the primary investigator assigned to the case to ensure quick communication.
- Type or print legibly. This form is used to relay information which is rendered useless if the analyst cannot read it.
- Clearly describe the type of evidence container and the item(s) being submitted. The description and item number should match what is on the RLS.
- Use one item number for each item of evidence submitted. If resubmission of the item of evidence is required, reuse the item number originally assigned to the item of evidence. Do not duplicate item numbers that have already been assigned in a previous submission.
- Evidence containers must be at least 5x7 inches or the size of a standard business envelope.
- Each evidence container should include the following **MINIMUM** information: agency name, agency case number, the item number and a description of the item.
- A secure seal is necessary for chain of custody. However, do not tape excessively. This makes the evidence handling in the laboratory difficult. Additionally, it is not necessary to use more than one outer package per item.
- Evidence Seals: An acceptable seal is one that prevents the ready escape of the evidence and will be clearly damaged or altered if broken to enter to package. Intact manufacturer seals do not need to be re-sealed with additional tape. Personnel sealing the evidence must place their initials or mark across the seal.



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CONTROLLED SUBSTANCES

The Controlled Substances Discipline analyzes evidence submitted by law enforcement agencies for the presence or absence of substances controlled under Alaska Statutes. The Controlled Substances Discipline does not quantitate controlled substances or have the ability to test for poisons.

If you have any questions concerning the Controlled Substances Discipline's examination capabilities or evidence handling procedures, please contact the Chemistry Supervisor Charles Foster at 907-269-5760 or via email at charles.foster@alaska.gov. For general questions regarding case status, reports, or discovery information please request via email at dps.scdl.chem@alaska.gov including the agency case number in your request.

Item Selection Policy

At a minimum, routine analysis shall include one item of a suspected controlled substance per defendant, per collection date. Items with weighable quantities will be selected before items with residue quantities. Evidence containing syringes will only be tested if results from all other items submitted are negative and only when the syringe contains a visible volume of liquid deemed by the analyst to be of testable quantity. Additional items will be analyzed if:

- No controlled substance is identified in the first item.
- The weight/count is near a legal threshold and there is a potential that testing of additional items will lead to exceeding that threshold.
- The physical characteristics or accompanying documentation of other items lead the analyst to suspect that a controlled substance of a different schedule may be present.

Submission Guidelines

Each item must be marked with a unique item number.

- a. Each item must be packaged in an appropriately sized container suitable for the evidence. Small objects (such as a "rock" of cocaine) may become lost or crushed in a large bag. Small items should be packaged in a suitable container and then placed in a larger outer container.
- b. The minimum size of the outer container is 5" X 7". This assures security of the evidence and allows the analyst room to re-package and secure the evidence without breaking your seal.
- c. Items that contain both controlled substances and latent print evidence can be separated prior to submission to the laboratory to reduce time for completion of the case. If you have questions regarding the best way to separate the evidence, please contact the Chemistry Supervisor. Remember to handle all evidence wearing gloves on latent print cases.
- d. The name of all suspects must appear on the request for laboratory services form. If there is more than one suspect, evidence items must be clearly associated with a particular suspect. List on the request for laboratory services form the location of where items were found in search warrant cases.
- e. Clearly mark probable cause exhibits on the request for laboratory services form.
- f. Note distribution cases on the request for laboratory services form.
- g. Only drugs and/or drug packaging will be accepted by the laboratory. Items with no probative value such as driver licenses, rolling papers and lighters should be retained by the submitting agency.
- h. The lab discourages the submission of evidence containing syringe needles. Only a vial containing the syringe's contents needs to be submitted to the laboratory. The laboratory will provide vials to law enforcement agencies upon request. Transferring content from the syringe as soon as possible will prevent the potential for liquid loss, liquid evaporation, and increased difficulty of removal due to needle clogging.
- i. Cases involving found property without a suspect will not be analyzed.

Collection and Submission of Evidence

- a. Ensure that all plant material submissions are dry prior to being packaged. Use paper bags or envelopes to prevent mold. Packaging wet or damp plant material can lead to evidence deterioration that may prevent testing. Allow wet plant material to air dry prior to packaging. Dirt, growing media and plant containers should not be submitted.
- b. Package sharps (such as razor blades) in a puncture proof container.
- c. Do not submit field test kits. Most kits contain strong acids which can leak and compromise the integrity of the evidence as well as cause burns to the skin if contacted.
- d. Please advise the laboratory if any submitted items have been recovered from a body cavity and mark the contaminated evidence with the biohazard warning label and symbol.
- e. A secure seal is necessary for chain-of-custody; HOWEVER, it is not necessary to tape excessively or "mummify" because this makes evidence handling in the laboratory more difficult.
- f. Items that need to be tested separately should be packaged separately. This will avoid cross contamination of items.
- g. LSD in liquid form can be absorbed through the skin. It is also light sensitive. Handle with caution and wrap container with paper to block light.
- h. When large amount of a substance suspected to contain controlled substances is collected, a representative sample is acceptable for submission as long as the amount submitted is sufficient for testing and it is clearly designated that it is a representative sample of a larger amount.

DO'S and DON'TS

DO package different substances as separate items in their own outer container. For example a white powder (item 1), green tablets (item 2), blue tablets (item 3) should be listed on the RLS on three lines and packaged in three outer containers.

DO ensure the minimum size of the outer container is at least 5" x 7".

DO package sharp objects in clearly labeled, puncture proof containers.

DO completely dry all wet or freshly cut plant material before packaging in paper bags or envelopes.

DO clearly indicate on the RLS items associated with each suspect or probable cause items.

DON'T submit used field test kits.

DON'T submit hypodermic syringes or needles.

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FORENSIC ALCOHOL

The Forensic Alcohol Discipline quantitates the amount of ethanol present in blood and suspected alcoholic beverage samples. Urine samples are not accepted for analysis.

Blood alcohol collection kits and beverage alcohol collection kits are provided to Alaska law enforcement agencies. Please request kits via email at dps.scdl.toxicology@alaska.gov.

If blood is collected utilizing non-gray top tubes please contact the Forensic Alcohol Discipline regarding shipping and storage instructions prior to shipping evidence to the Crime Lab.

If you have any questions concerning the Forensic Alcohol Discipline's examination capabilities or evidence handling procedures, please contact the Chemistry Supervisor Charles Foster at 907-269-5760 or via email at charles.foster@alaska.gov. For general questions regarding case status, reports, or discovery information, please request via email at dps.scdl.toxicology@alaska.gov including the agency case number in your request.

Blood Alcohol Analysis

- a. Collect blood samples utilizing a blood alcohol collection kit provided by the Crime Lab following the instructions inside the kit. The current kit contains 4 ten-milliliter tubes. Use all tubes to collect whole blood following 13 Alaska Administrative Code 63.110.
- b. Clearly label blood tubes with the following information: suspect's name, collection date, collection time, and the blood collector's initials.
- c. Do not collect samples at different times to try and establish an elimination rate. The lab will only test samples from the first collection time.

Beverage Alcohol Analysis

- a. For beverage alcohol cases collect samples utilizing a beverage alcohol collection kit provided by the Crime Lab following the instructions inside the kit. Do not discard the powder inside the tubes.
- b. The Forensic Alcohol discipline will not analyze factory sealed commercial products.
- c. When multiple containers of suspected beverage alcohol are submitted, the analyst will choose one for testing. Testing of additional containers may occur in the following circumstances:
 - The contents from the initially chosen container tested negative
 - The overall appearance of the containers and/or liquids are different
 - The combined volume (obtained from the manufacturer labels) of the multiple containers exceeds a legal threshold.

DOS and DON'TS

- DO** collect blood samples as soon as possible after the offense.
- DO** label all blood tubes with the name of the subject, date and time taken, initials of person collecting the samples.
- DO** handle all blood tubes using procedures to protect the chain of custody.
- DON'T** use an ethanol-based antiseptic to cleanse the person's skin.
- DON'T** submit blood collection implements (syringes, needles, lances, swabs, gauze, etc.)
- DON'T** submit urine for any type of testing.

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DRUG TOXICOLOGY

The Alaska Scientific Crime Detection Laboratory does not have the ability to test for drugs in evidentiary blood samples. Drug toxicology testing for traffic related offenses is provided through a grant managed by the Crime Lab. This grant is funded through the Alaska Highway Safety Office for the analysis of blood samples at a toxicology laboratory for driving related offenses only. Samples are sent to a contracted toxicology laboratory via the Crime Lab.

Probation offenses, police involved shootings, homicide and sexual assault offenses are examples of cases not covered under this grant. Any blood or urine samples collected in non-driving related offenses that require drug toxicology analysis may be submitted to a private laboratory by the investigating agency. The investigating agency will be responsible for the cost of direct submission to the private laboratory, testing, and continued storage or return of evidence to the investigating agency.

Blood alcohol analysis is performed by the Crime Lab for all offenses. Please refer to the Forensic Alcohol portion of this manual for further information.

If you have any questions concerning drug toxicology testing, please contact the Chemistry Supervisor Charles Foster at 907-269-5760 or via email at charles.foster@alaska.gov. For general questions regarding case status, reports, or discovery please request via email at dps.scdl.toxicology@alaska.gov including the agency case number in your request.

Blood Drug Analysis

- a. In cases where DUI is suspected, the best toxicology sample to collect from the subject is blood. Urine samples will not be analyzed for drug toxicology in traffic related offenses.
- b. Blood samples submitted in DUI cases are only analyzed for drugs, other than alcohol, when specifically requested by the submitting authority. Currently, in DUI cases, blood drug testing is not performed if the blood alcohol level is 0.100 g/100mL or more unless a DRE examination was performed.
- c. Collect blood samples utilizing a blood alcohol collection kit provided by the Crime Lab following the instructions inside the kit. The current kit contains 4 ten milliliter tubes. Use all tubes to collect whole blood following 13 Alaska Administrative Code 63.110.
- d. Drug toxicology testing will only be performed on traffic related cases based on the conditions of the grant. Agencies must submit samples for drug toxicology testing in all other types of cases (sexual assaults, homicides, etc.) to a private laboratory and pay for the testing.

DO'S and DON'TS

- DO** collect blood samples as soon as possible after the offense.
- DO** label all blood tubes with the name of the subject, date and time taken, initials of person collecting the samples.
- DO** handle all blood tubes using procedures to protect the chain of custody.
- DON'T** use an ethanol-based antiseptic to cleanse the person's skin.
- DON'T** submit blood collection implements (syringes, needles, lances, swabs, gauze, etc.)
- DON'T** submit blood samples for blood drug testing in non-traffic related cases.
- DON'T** submit urine samples to the crime lab.

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BREATH ALCOHOL PROGRAM

The Breath Alcohol Program, as outlined in 13 Alaska Administrative Code Chapter 63, is responsible for the:

- certification, calibration and maintenance of the evidential breath testing instruments
- training and certification of breath test supervisors
- development of the breath test operator training program
- certification of breath test operators
- instrument and training records.

If you have any questions concerning the Breath Alcohol Program, please contact the Scientific Director Charles Foster at 907-269-5760 or via email at charles.foster@alaska.gov. For general questions regarding training, operator status, or discovery information, please request via email at dps.scdl.toxicology@alaska.gov. Breath Test Supervisors can request an external gas cylinder via email at dps.scdl.toxicology@alaska.gov or by contacting the Breath Alcohol Program directly.

The only evidential breath testing instrument approved for use in Alaska is the DataMaster DMT. Instruments are provided to local law enforcement agencies that have a dedicated analog modem line, a certified breath test supervisor, and upon approval by the Scientific Director.

Breath Test Operators must successfully completed a four hour course of instruction approved by the Scientific Director. This course is taught by certified Breath Test Supervisors. Breath Test Supervisors must successfully completed a twenty-two hour course taught by the Breath Alcohol Program staff. Breath Test Operator and Breath Test Supervisor certifications expire on December 31 of the third year after the year issued.

The following documents are located on the Laboratory website www.dps.alaska.gov/CrimeLab/datamaster.aspx:

- Verification of Calibration Reports
- Breath Alcohol Procedure Manuals and Archived Manuals
- Calibration Records and Certification Records
- Change in Instrument Status Records
- Check-In Records and Evaluations Records
- Certificates and/or acceptance documentation for wet bath simulators, wet bath simulator solutions, dry gas standards, and barometers
- Software approval documentation
- Current list of certified breath test operators
- Breath test record summary for all instruments including any status codes generated
- Communications from the Scientific Director

Note: Records produced pre-2015 may not be posted on the Laboratory website. These documents can be provided by the Scientific Director upon request from the prosecutor.

The Breath Alcohol Program provides expert testimony in the interpretation of blood and breath alcohol results. The Interpretation of Alcohol Results manual, which is available on Crime Lab website on the Quality Assurance Documents page, outlines the information that would be given in this testimony.

FORENSIC BIOLOGY

OVERVIEW

A biological substance, such as, blood, semen, saliva, or tissue that leaves the human body and is left at the scene of a crime, may provide valuable information as to who was present at a scene and what events might have occurred. The value of this evidence can be greatly diminished if not properly collected, packaged, and preserved. In addition, due to the sensitivity of the DNA technology used by the Forensic Biology discipline, if proper precautions are not taken while collecting evidentiary samples, there is an increased likelihood of introducing contamination from a foreign DNA source unrelated to the crime. It is also possible to transfer unrelated sources of DNA between crime scene samples if the evidence is not packaged correctly.

PROCESSING OF EVIDENCE BY THE FORENSIC BIOLOGY SECTION

The initial examination performed by the Forensic Biology discipline is screening the evidence to identify the possible presence of a biological substance (i.e., blood or semen). Probative biological evidence can then be analyzed using a DNA technology specifically designed to test minute amounts of biological material at 16 different areas of the DNA. The DNA profile obtained from the "questioned" evidence is compared to the DNA profile from evidentiary known samples (victim, suspect, or elimination buccal samples) to determine if an individual is included or excluded as a possible source of the biological substance. If no suspect has been identified, the foreign DNA profile may be searched against the DNA profiles in the DNA database, CODIS, which is comprised mainly of DNA profiles from convicted offenders and individuals arrested for specific crimes (as per AS 44.41.035), to aid law enforcement in identifying a possible perpetrator.

DEFINITIONS

Biological Material

Body fluids such as blood, seminal fluid or saliva, or a biological substance such as hair and tissue (muscle, fetal material, etc.)

Combined DNA Index System (CODIS)

A collection of DNA profiles primarily from persons arrested or convicted of certain misdemeanors and felonies as specified in AS 44.41.035. The CODIS database also contains DNA profiles obtained from crime scene samples, unidentified human remains, missing persons, and relatives of missing persons.

Contact or Touch DNA Evidence

Evidence resulting from casual contact by an individual with a surface or material. This would include primarily objects touched by an individual's hand(s), such as gun grips, triggers, knife handles, steering wheels, etc.

Deoxyribonucleic Acid (DNA)

The genetic material found in various body tissues (muscle, fetal tissue, skin, etc.) and body fluids (semen, vaginal fluid, blood, saliva, etc.). Because an individual's DNA is the same from cell-to-cell within the body and is different from individual-to-individual, DNA can be used to determine whether a biological substance may have been deposited by a specific individual.

Offender Kit

A kit used for the collection and preservation of statutorily mandated DNA samples (from convicted offender and arrestees) for entry in the DNA database.

DNA Profile

The combined results that are obtained when testing DNA at several locations on various chromosomes; from the nucleus of the cell. The DNA comprising an STR profile is inherited from both biological parents.

Y-Chromosome DNA

Male specific DNA found in the nucleus of most cells of the body. This type of DNA is inherited paternally. All males within a family (e.g., father, grandfather, brother, uncle, and cousin) will have the same Y-chromosome DNA profile, except where mutations occur.

Semen

A biological substance secreted by males that consists of a combination of seminal fluid and spermatozoa

Seminal Fluid

A biological fluid produced by males for the transport of spermatozoa. May be absent of spermatozoa in vasectomized males or males with certain medical conditions.

Spermatozoa

The male cell involved in reproduction; carries one-half of the genetic information for a new individual

Wearer DNA

DNA recovered from an article of clothing in an effort to identify the wearer of the garment

CAPABILITIES AND SERVICES

The primary function of the Forensic Biology discipline is the identification of biological material and the use of DNA analysis to determine whether the biological material could have originated from a specific individual.

The Forensic Biology discipline provides three types of service: biological screening of forensic casework, DNA analysis of forensic casework, and DNA analysis of offender samples. Separate scientific reports are issued for biological screening and DNA testing of forensic casework.

The laboratory also issues CODIS hit letters to notify law enforcement when there is a DNA match between samples in the DNA database. CODIS hits are investigative leads, typically identifying a potential source of biological material from crime scene evidence.

Biological Screening

- 1) **Blood evidence** – Blood evidence may be encountered in homicides, assaults, sexual assaults and property crimes. Biological screening for blood answers three questions:
 - a) Are there stains present on an item which are visually consistent with blood?
 - This is typically accomplished by examining items using stereomicroscopy.
 - b) Is the stain blood?
 - The laboratory uses a presumptive chemical test to evaluate potential blood stains. A positive

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presumptive test result is indicative of, but not confirmatory for, the presence of blood.

- c) If the stain is blood, is it human?
 - Typically, presumptive positive stains will proceed directly to DNA analysis. Occasionally, it is necessary to identify a stain as human or animal. The laboratory uses an immunoassay test card to identify stains that are human (or higher primate) in origin.
- 2) **Semen evidence** – Evidence in sexual assault cases is often screened for the presence of semen. Biological screening for semen answers two main questions.
 - a) Are there stains present on an item which are visually consistent with semen?
 - This is typically accomplished by examining items with an alternate light source.
 - b) Is the stain semen?
 - The laboratory uses a presumptive chemical test to evaluate potential semen stains or swabs that may contain semen. A positive presumptive test result is indicative of, but not confirmatory for, the presence of semen.
 - Stains/swabs may also be tested for the presence of PSA (prostate specific antigen), a protein that is strongly indicative of semen, although not confirmatory.
 - Stains that are presumptive positive for semen are examined for the presence of Male DNA. Samples with sufficient male DNA may proceed to DNA analysis.
- 3) **Hair evidence** – Hair evidence can be relevant in many types of cases. Microscopy is used to examine hair evidence.
 - a) Is the evidence a hair?
 - i) If the evidence is hair the following questions are answered.
 - b) Are the hairs human or animal?
 - i) Once identified, animal hairs must be sent to a private lab, if further analysis is required.
 - c) Are the human hairs suitable for STR DNA analysis?
 - Hairs not suitable for analysis at the laboratory may be suitable for Mitochondrial DNA analysis by a private laboratory.
- 4) **Saliva evidence** – Saliva evidence is often relevant in sexual assaults and property crimes. The laboratory does not screen specifically for saliva. Samples that potentially contain saliva are forwarded on for DNA analysis.
- 5) **Skin cell evidence** – Skin (epithelial) cells are potentially relevant in most types of crimes. The laboratory does not screen for epithelial DNA. Samples are typically collected by swabbing an item and sending the swab on for DNA analysis. Items sampled vary from swabs from an individual's body where forceful skin to skin contact between individuals may have occurred, to swabs of items thought to be handled extensively by an individual.
- 6) **Vomit/Urine/Fecal Samples** – The laboratory does not perform biological screening for these sample types owing to a lack of reliable tests available for this purpose. DNA testing on these types of samples is often unsuccessful with current laboratory methods and therefore, not routinely performed. Contact the discipline supervisor or technical manager if this type of analysis is required in a specific case.

DNA Testing

- 1) **STR Testing on Forensic Casework** - Samples retained in the biological screening process are

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subsequently processed through DNA analysis in an attempt to determine if the biological material may have originated from a specific individual. The analysts use a commercially available DNA typing kit which permits the scientist to simultaneously test several different areas of the DNA. DNA profiles for samples whose origin is in question are compared to DNA profiles from reference (known) samples. There are three possible results of a DNA comparison: individual is excluded as the source of DNA, individual cannot be excluded as the source of DNA, no conclusion can be made (inconclusive). If the DNA profile obtained from the questioned sample is consistent with the DNA profile obtained from the known sample (i.e. individual cannot be excluded), a statistical assessment is performed to give weight to the conclusion.

- a) **CODIS** – DNA profiles (from crime scene evidence) that either match a suspect or can be reasonably believed to be attributable to the perpetrator of a crime, can be entered into the DNA database to generate investigative leads.
- 2) **STR Testing on Convicted Offenders/Arrestees** – The laboratory is the repository for the statutorily mandated DNA samples from certain convicted offenders and arrestees. The laboratory generates DNA profiles for the offender samples and enters them into the CODIS (DNA) database.
- 3) **Criminal Paternity/Maternity** - The laboratory performs DNA analyses in alleged sexual assault cases that result in the conception of a child. This type of analysis requires reference samples from both biological parents (or alleged biological parents) as well as the child. For live births or late term fetuses, a buccal swab is preferred. Blood or tissue samples may be submitted from miscarried or aborted fetuses. The laboratory cannot typically perform DNA analysis on fetal tissue less than 8 weeks gestation.
- 4) **Y-Chromosome DNA Testing (future capability)** - This testing is utilized primarily in cases with mixtures of DNA where there is a high female to male ratio, and in cases where seminal fluid is indicated but the sample is absent of spermatozoa. At this time, Y-chromosome DNA profiles are not searchable in a DNA database. Therefore, this testing will only be recommended in cases with known reference samples for the potential male contributors.
- 5) **STD testing** – The laboratory does not perform this service. The public health laboratory performs testing to confirm the presence of some viruses, but they are not able to perform DNA analysis to identify particular strains of the virus. Agencies should contact the health lab directly for additional information.

EVIDENCE COLLECTION GUIDELINES

Biological fluids and body fluid stains are valuable evidence which can be used to either associate a victim or suspect with a crime/crime scene or eliminate them from consideration. The most frequently encountered biological fluids are blood, seminal fluid, and saliva.

Safety Precautions

It is imperative when collecting or packaging biological evidence for submission to the laboratory that clean latex gloves be worn and changed often. Depending on the crime scene, shoe covers, gowns, masks, head covers, and safety glasses may also be appropriate. Body fluids, wet or dry, have been shown to carry disease. Dry stains may flake when disturbed or collected, sending minute particles airborne. These may be absorbed through mucus membranes (eyes, nose, mouth, etc.), open cuts, or chapped skin. Therefore, all

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biological materials and fluids must be handled with universal precautions. Wearing the appropriate protective clothing also helps minimize contamination of the evidence sample with your DNA.

General Collection Guidelines

All biological evidence should be air-dried prior to submission to the laboratory. Refrigerating the evidence will retard bacterial growth on wet material. However it will not stop the growth which can then lead to degradation of the biological material. The sooner the biological evidence is dried, the more likely useful information can be obtained from the evidence through DNA analysis.

Biological evidence should be packaged in paper bags or envelopes; NEVER in plastic bags.

During the collection, air-drying, or packaging of any body fluid stains, caution should be used to ensure that a stained area from an item of evidence does not come in contact with another stained or unstained area. This applies to outer surfaces and inner surfaces. For example, a shirt should not be folded or rolled so that a stain on the front contaminates any stained or unstained area on the back or inside of the shirt. A barrier, such as paper or cardboard should be placed on the inside of the shirt, as well as under and over the garment to prevent stained areas from coming in contact with each other.

When air drying articles stained with body fluids, place them on or over a piece of clean paper. Any debris which falls from the material onto the paper during the drying process will be collected when the paper is folded with the article prior to packaging, labeling and sealing.

Body fluid evidence can be contaminated by the crime scene officer's own body fluids. The perspiration on the officer's hands may contaminate the cotton swabs used to collect the body fluids, or talking while collecting samples may spread the officer's saliva on the evidence. To prevent such contamination protective clothing (i.e., latex gloves, gowns, masks, and head covers) should be worn while collecting the evidence. To avoid possible sample-to-sample contamination, change latex gloves (and other applicable protective wear) as necessary when collecting evidence.

When practicable, it is best to submit the entire item of evidence to the laboratory for evaluation. If an item has been swabbed by the agency, the laboratory will not analyze the item the swab was taken from for DNA analysis. Evidence (once packaged) should be submitted to the laboratory as soon as possible. Otherwise, the items should be stored in an appropriate secured storage location until submission to the laboratory is possible. To minimize degradation of DNA, evidence should not be stored in extreme humidity or at elevated temperatures. Dry, cool storage locations are best.

Body Fluids on Non-Porous Surfaces (i.e., bottles, cans, window, knife, firearm, body, etc.)

1. Double-Swab Method: (For samples taken from non-porous objects like bottles, cans, windows, knives, firearms, etc.) A sterile swab is moistened with sterile/distilled water (WET) and the area of interest is swabbed. Using the second sterile swab (DRY) immediately re-swab the area. Let the swabs dry before packaging. Two swabs only should be collected per area of interest.
2. Single-Swab Method: (For samples taken from areas of the body such as external genitalia, finger/hand swabs, neck swabs due to possible strangulation, etc.) Moisten one sterile swab with sterile/distilled water and swab the area of interest. Let the swab dry before packaging. One moist swab only should be collected per area of interest.
 - Note: Double-tipped swabs and Q-tips should not be used.

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- Note: Avoid scraping crusts due to risk of airborne flakes.

Swabs from an item of evidence, such as the mouth of a bottle or an area of the grip of a firearm of no value for latent print examination, can be submitted for DNA analysis while the actual item of evidence can be submitted for examination by the Latent Print or Firearms disciplines.

The Forensic Biology Section no longer analyzes control swabs, therefore there is no need to collect or submit a control swab to the laboratory.

Body Fluids on Porous Surfaces (i.e., clothing, bedding, carpet, untreated wood, etc.)

Submit the air-dried item of evidence if possible. For large items (large carpets, upholstered furniture, etc.) it may be necessary to cut out the stained areas or swab the stained area with a sterile swab moistened with one to two drops of water. Saturate one swab with the stain before absorbing onto the next swab. Allow the swab(s) to air dry or place the swab(s) in a new labeled swab box for drying. It is not necessary to collect more than 2 saturated swabs for submission to the laboratory.

If cuttings/swabbings are taken from different areas on an item, package the cuttings/swabbing from each area separately. The packages from separate cuttings/swabbings of a single item may be sealed individually and then combined into a larger package.

- Note: Double-tipped swabs and Q-tips should not be used.
- Note: Avoid scraping crusts due to risk of airborne flakes.

The Forensic Biology Section no longer analyzes control swabs, therefore there is no need to collect or submit a control swab to the laboratory.

Sexual Assault Evidence Collection Kit (SART kit)

A kit used for the recovery of physical evidence from the body of the potential victim or suspect of an alleged sexual assault. A specialized kit exists for pediatric victims. The kit contains supplies to recover foreign secretions and trace evidence (i.e., hairs) from the body. In addition, the kit contains supplies for the collection of a known sample from the individual for comparison with the foreign secretions and hairs. Kits are available for law enforcement officers and hospitals, requests for kits should be sent to dps.crime.lab.web@alaska.gov.

Medical personnel are urged to follow the instructions supplied with the kit and to complete all portions of the kit paperwork. The forensic history in particular, is essential to laboratory scientists during their analysis.

Only underwear worn by the subject to the exam, are to be included in the kit itself. Other garments should be packaged as separate items of evidence.

- If the underwear worn to the exam are not the same ones worn immediately post event, law enforcement should attempt to obtain those underwear and submit them as a separate item of evidence. The underwear worn immediately post event are most likely to contain biological materials related to the event.

The kit should be sealed immediately upon completion and initialed by the examining clinician/doctor and turned over to law enforcement for submission to the laboratory.

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Condoms

Used condoms should be air dried and submitted to the lab for processing. When the condom contains a volume of liquid, place two (or more if needed) sterile swabs in the condom to absorb the liquid. **DO NOT** pack the condom with gauze or paper towels. Allow the outer surface of the condom to air dry and package in a sealed envelope for submission to the lab. The lab will not routinely analyze unused condoms.

Contact DNA Evidence

Submit the item of evidence (preferred) or take a swabbing of the evidence with a single sterile cotton swab that has been slightly moistened with one (1) to two (2) drops of water. Allow the swab to air dry or place the swab in a new labeled swab box for drying. A single swab is recommended for collection to concentrate the foreign DNA that may be present and to increase the likelihood of collecting sufficient biological material to obtain a DNA profile.

- Note: Double-tipped swabs and Q-tips should not be used.

When an item requires both latent print and DNA analysis, biological screening is typically done prior to latent print examinations. Typically, smoother items (blades, slides of guns, etc.) are better for latent print recovery and textured surfaces (grips, handles, etc.) are better for contact DNA recovery. Some items are better suited for one examination or the other and will not have both types of processing performed, even when requested. The following items will not routinely have both contact DNA and latent exams conducted:

- Casings/bullets – only latent print examination will occur
- Condom wrapper – only latent print examination will occur
- Unopened beverage containers – only latent print examination will occur
- Beverage containers likely drank directly from – both exams are possible. If probative findings are obtained from either latent prints or DNA, the other analysis will generally not be performed
- Cigarette packages – only latent print examination will occur
- Cigarette butts (smoked) – only DNA analysis will occur
- Unsmoked cigarettes – neither examination will occur

Known/Reference Buccal Swabs

Buccal swabs are collected by taking two (2) sterile cotton swabs and swabbing the inner cheeks of the mouth. The swabs should be rotated during the collection process to maximize collection of cells. Let swabs dry then place both swabs together into one labeled envelope. It is not necessary to collect separate samples from the left and right inner cheeks. This is considered all one sample.

Reference samples should be collected from all persons suspected of involvement in an investigation, who may be contributors of biological evidence. These samples are part of the SART kit, but must be collected separately for persons on whom a SART kit has not been collected.

“DNA on file” with the DNA database (CODIS) is NOT an acceptable substitute for an evidentiary known sample with a proper chain of custody. Known/reference samples should be collected for each separate criminal investigation that an individual is associated with. These samples should be submitted along with other evidentiary material to ensure that laboratory testing is not suspended pending receipt of known samples.

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DNA Database Collection Kit

These kits are exclusively for use in collecting the statutorily mandated samples from arrestees and convicted offenders. The kit contains instructions for the proper collection of the samples (buccal swabs and thumb prints) and completion of the information card. These kits are NOT for use in collection of the required known/reference samples for a criminal investigation.

Products of Conception (for Criminal Paternity Investigations)

Tissue collected from an aborted fetus that is 10 to 12 weeks old may contain identifiable body characteristics (i.e., hands and feet) that can easily be isolated by the DNA analyst for testing. If the fetus is less than 10 weeks old, the body characteristics may not be easily identified by the examiner.

When possible, request the medical doctor to isolate a portion of the fetal tissue from the maternal tissue and place the fetal tissue into a hard plastic container (i.e., specimen cup). Alternatively, the entire aborted fetal material may be submitted.

- Note: The fetal tissue/material should not be stored in a saline solution or any other type preservative.

Submit the container to the laboratory the same day. If it is not possible for the aborted fetal tissue/material to be submitted to the laboratory the same day, place the container into a refrigerator and submit to the laboratory the next day. Within a short period of time fetal tissue/material stored in plastic, even if refrigerated will promote bacterial growth, which can destroy biological material and potentially preclude the examiner from obtaining DNA results.

CASE MANAGEMENT

Cases submitted for biological screening and/or DNA testing are prioritized for analysis. Crimes against a person are given priority over property crimes, with the most severe offenses being placed ahead of other cases.

The number of samples analyzed will be kept to a reasonable number and limited to relevant items based on the case synopsis. Once probative results are obtained, additional analysis will not be performed.

Analysis cannot proceed without submission of the required known samples. The submitting agency should contact the Forensic Biology discipline supervisor if circumstances prevent the agency from collecting the required knowns (i.e. unable to obtain search warrant or unable to locate individual).

When the required known samples are not received within 30 days of the original request for analysis, the request may be inactivated and evidence may be returned to the submitting agency. Requests will be reactivated upon receipt of the required known samples with a new Request for Laboratory Services (RLS) form. It may be necessary to resubmit items that were returned to the submitting agency.

The following guidelines, utilized by laboratory personnel in sample selection, have proven effective, but may vary slightly on a case-by-case basis.

1. Sexual Assault Cases

Known – Victim(s) - required

Known – Suspect(s) – required except in unknown suspect cases

Known – Consensual sex partner(s) – recommended when consensual sexual contact occurred within 5 days

Two to three questioned samples

*Sexual assault cases with unknown allegations (i.e. blacked out victim) – Analysis will be limited to body swabs for semen and breast swabs (bite marks, etc.) if indicated by forensic history. Underwear will be processed only if SART kit was collected beyond 48 hours and underwear are known to be those worn immediately post-event.

2. Non-Sexual Assault Cases

Known – Victim(s) - required

Known – Suspect(s) - required except in unknown suspect cases

Typically, up to three questioned samples will be analyzed. Exceptions may occur based on the number of individuals involved and the number of items with probative value, essential to either proving or disproving the alleged events.

3. Homicide Cases

Known – Victim(s) - required

Known – Suspect(s) - required except in unknown suspect cases

The number of questioned samples will be determined based on the number of individuals involved and the number of items with probative value, essential to either proving or disproving the alleged events.

*Verbal communication with the lab is required before analysis will proceed and all available, relevant evidence shall be disclosed to the laboratory. Parties shall agree on a testing plan.

4. Criminal Parentage Cases

Known – Mother or Alleged Mother

Known – Father or Alleged Father

Known – child or product of conception

No partial submissions will be accepted, unless dictated by case circumstances (such as mother is deceased or maternity is in question and the father is unknown).

5. Property Crime Cases

Known – Victim(s) – required in cases where tested items were handled by victims (ex. vehicle theft)

Known – Suspect(s) - required except in cases with no known suspect

Typically, only one or two questioned samples will be analyzed. Bloodstains and saliva samples (e.g. cigarette butts, mouth areas of cans and bottles) are most likely to yield DNA profiles suitable for comparison.

Contact DNA samples will be limited to items brought to and/or left at the scene by the suspect. Items inherent to a scene that were only briefly touched or handled by a perpetrator do not typically yield interpretable DNA profiles and will not typically be processed by the laboratory.

Only steering wheel and gear shift contact/touch swabs will be processed from vehicles, as these have proven the most likely to yield interpretable DNA profiles.

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The following will not be processed by the laboratory:

- The laboratory does not perform biological screening and/or DNA analysis on controlled substance cases.
- The laboratory will not perform DNA analysis on items dusted for fingerprints prior to swabbing, as fingerprint brushes have been shown to be a potential source of DNA contamination. The discipline supervisor or technical manager should be contacted to request an exception. Items that require both DNA and latent examination may be submitted directly to the laboratory for examination.
- The laboratory will not perform DNA analysis on charred or burnt evidence, and fired cartridge casings as these items have been shown to routinely yield little to no interpretable DNA.
- The laboratory will not perform DNA analysis on items of evidence directly taken from a subject in a possession case (i.e. body cavity, pockets, or waistband).

RUSH Analysis

The laboratory collaborates with the Department of Law (DOL) to ensure that analysis is completed in a timely manner for cases with pending court dates/deadlines or where there is an immediate threat to public safety. Requests for RUSH analysis shall be made by the assigned prosecutor, in writing, to The Forensic Biology Supervisor. Prior to requesting RUSH analysis, the prosecutor should contact the law enforcement agency to confirm that evidence (including the required known reference samples) has been submitted to the laboratory. A case will not be elevated to Rush priority if the laboratory has not received the required known samples.

Communication

Often, the assigned laboratory analyst will require additional information or evidence to complete analysis. It is imperative that law enforcement/prosecutors reply to requests in a timely manner to prevent long delays in evidence processing.

When requests for additional information or evidence (typically known samples) are not replied to within 30 days, requests for analysis may be inactivated and evidence may be returned to the submitting agency. Requests will be reactivated upon receipt of the information or the required known samples with a new Request for Laboratory Services (RLS) form. It may be necessary to resubmit items that were returned to the submitting agency.

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FIREARMS/TOOLMARKS

Contact Us

- If you have any questions concerning the Firearm/Toolmark examination capabilities, contact the Physical Section supervisor David Kanaris at 907-269-5621 or via email at david.kanaris@alaska.gov.

Overview

The primary concern of the firearm examiner is the examination of firearms and ammunition components in an attempt to associate a particular firearm as having fired particular ammunition components, through microscopic study, to the exclusion of all other firearms.

CAPABILITIES AND SERVICES

Mechanical Condition of Firearms

Each firearm that is submitted to the firearm section is examined to determine whether it is in mechanical operating condition and it is test fired, when possible. This examination includes the operability of the safety features, physical characteristics of the firearm and trigger pull. In addition, examinations can be conducted to determine whether the firearm will or will not fire without pulling the trigger, when necessary. Also, capability of full automatic fire is determined.

Identification of Firearm Parts

Firearm parts found at a crime scene may be identified as to:

- a. The type of firearm from which they originate
- b. Whether the part came from an evidence firearm (Fracture Match)

Identification of Brand

Bullets, wad components, cartridge cases and shotshells recovered at a scene or from a body may be identified by brand.

Possible Brand and Caliber of Firearm

By determining the class characteristics (caliber, number of lands and grooves, direction of twist and their dimensions, breechface and/or firing pin shapes, other various markings) exhibited on fired ammunition components (bullets, cartridge cases, shotshells), the firearm examiner may be able to provide information concerning the brand and type of firearm which the component was fired. This may be particularly useful when no firearm has been recovered.

Bullet Identification to a Particular Firearm

When a rifled firearm is manufactured and through its use, unique toolmarks are left on the inner surface of the barrel. When the firearm is fired, striated marks are engraved in the bullet. These striae are individual to a particular firearm.

When a firearm is submitted to the laboratory for comparison, the examiner test fires the firearm and uses a comparison microscope to compare the striae of the test fired bullet to those present on the evidence bullet. By this microscopic study of the markings on both bullets, the examiner can determine if the evidence bullet was fired from the submitted firearm. The following conclusions may be reached:

- a. The bullet was identified as having been fired from the firearm.

- b. The bullet was eliminated as having been fired from the firearm.
- c. It is not possible to identify or eliminate the bullet as having been fired from the firearm.

Firearm not Recovered

Bullets and cartridge cases/shotshells recovered from the same or different incidents can be compared to determine if they were fired from/in the same firearm.

Bullet Fragments

The firearm examiner may be able to provide the same type of information from a bullet fragment as that of a whole bullet. A bullet fragment can be identified as having been fired from a particular firearm if sufficient marks are present. The quantity and quality of these marks are determined by microscopic examination. All bullet fragments should be collected and submitted to the laboratory.

Cartridges

If the cartridge has been cycled (loaded, extracted and ejected) through the action of a bolt- action, lever-action, slide-action or autoloading firearm, the markings left by this process may be associated with a particular firearm. In some cases markings left on cartridges may be associated to a particular magazine. If these types of marks are present on cartridges, it may also be possible to associate them to cartridge cases, if no firearm has been recovered.

Cartridge Cases

Generally, there are five surfaces of a firearm that may leave identifiable marks on various areas of a cartridge case: breechface, firing pin, extractor, ejector, chamber. Generally, if a fired cartridge case can only be identified to a particular firearm by the extractor and/or ejector mark(s), this only identifies the cartridge case as having been extracted and/or ejected (i.e., cycled) in a particular firearm.

Identification of Possible Brand of Firearm

By determining the class characteristics (caliber, type of breechface marks and firing pin shape) exhibited on a fired cartridge case, the firearm examiner may be able to provide information concerning the type and brand of firearm which fired the cartridge case(s). This may be particularly useful when no firearm has been recovered.

Shotshells

These may be associated to a firearm in the same manner as cartridges. The gauge may be determined and the brand of the components may be characterized.

Discharged Shotshells

These may be identified in the same manner as a fired cartridge case. In addition, the components that may have been commercially loaded into the shotshell may be identified.

Shotshell Components

Recovered wad material and/or projectiles may be identified as to gauge, type, and/or brand of commercial manufacture.

Distance (Proximity) Determination

The approximate distance the muzzle of a firearm was from an object at the time of firing may be determined by examining clothing or other materials for the presence of gunshot residues. Gunshot residues are discharged from the firearm in the form of burnt, partially burnt and un-burnt gunpowder particles,

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vaporous lead, and particulate metals. When packaging objects thought to contain gunshot residues, use packaging techniques that protect the surface and minimize cross-contamination.

Generally, the firearm and all ammunition components associated with the firearm should be submitted along with the object to allow for a thorough examination for approximate distance. If no firearm is available for submission, the laboratory can still examine the object for the presence of gunshot residue. However, distance determination when no firearm is available is limited to contact gunshots.

Pellet patterns can also be examined for distance determination based on the rate of pellet spread over a given distance for a particular weapon and ammunition.

Reconstruction/Trajectory Analysis

The analysis of objects brought to the laboratory can be conducted to aid in the investigation for determination of trajectory and origin of the shots fired, help locate other pertinent evidence, and help determine the position of the victim and/or the shooter.

COLLECTION GUIDELINES

ITEM - Firearms (handgun or shoulder gun)

METHOD - All firearms to be submitted to the laboratory should be made safe. Unload firearms after properly documenting the cylinder in revolvers or the chamber and magazine in pistols, rifles and shotguns. Package firearms in a rigid container, seal, mark container and indicate condition of firearm on container as **LOADED** or **UNLOADED**. Firearms submitted for DNA must be sealed with tape over all edges and any openings (such as holes in the box) prior to submission (see example in General Submission of Evidence).

DISCUSSION - Safety is the first consideration; therefore, firearms should be unloaded prior to delivery to the laboratory. If this is not possible, call the firearm supervisor to discuss. Packaging material may rub latent prints and destroy evidence; therefore, it is important to package in a manner so the gun contacts the packaging material as little as possible. Documenting the cylinder in a revolver may help determine the sequence of events and aid in scene reconstruction. It is requested that you not package guns in plastic.

ITEM – Bullets, shot pellets, slugs and shotshell wads

METHOD - Recover using rubber tipped forceps or latex examining gloves, so as not to contaminate or add trace or other biological evidence. Place in a plastic zip lock type bag. Package projectiles separately, clearly label and seal properly. It is currently suggested not to mark the item itself. Bullets, etc. collected from doctors in the emergency room should be washed off with water (not disinfectants) prior to submission and air dried before packaging. Body fluids may destroy some microscopic markings.

DISCUSSION - Handling these items with your fingers may add additional trace or biological evidence. Bullets, etc. should be handled as if biohazards are present and in a manner to protect any DNA that may be present. The chain of custody can be maintained by marking the packaging material and carefully noting your actions.

ITEM - Cartridge, cartridge case, shotshell

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METHOD - Recover using rubber tip forceps or gloves so as not to obliterate fingerprints, or damage trace evidence. Cartridges, cartridge cases, and shotshells may be placed in a ziplock bag if fingerprints are not a concern. Properly label and seal the container. If fingerprints are a concern, package in a manner that will immobilize the item and/or reduce the contact with the packaging material. Never mark the headstamp area or other portions of the cartridge, cartridge case, or shotshell. In incidents where the use of sabot ammunition is suspected, the investigator should be aware that the sabot may have separated from the projectile (bullet or slug).

DISCUSSION - Handling these evidence items may destroy fingerprint evidence. The marks in the headstamp area and other portions are used in the laboratory comparison and identification process. Ammunition found at the scene or in the suspect's house may be helpful in the comparison process. The sabot bears the identifying marks (the bullet/slug in this instance does not).

ITEM - Clothing for gunpowder/gunshot residues related to distance (proximity) determination

METHOD - Completely air dry the clothing. Place clothing item flatly onto a clean piece of butcher paper sufficiently larger than the item itself. Properly label and seal the container. Also, please submit the autopsy report from the M. E., the police report, room size, constraints, witness/suspect statements, and any information that may be pertinent to the investigation.

DISCUSSION - This packaging approach ensures that the area of the clothing bearing the gunshot residue will not come in contact with other areas of the garment. This is also a good procedure for bloody garments. Plastic will cause the biological material on the clothing to deteriorate, even if it is thoroughly air dried.

Toolmarks Overview

Toolmark Identification is a discipline of forensic science which has as its primary concern to determine if a toolmark was produced by a particular tool. Toolmark cases may involve any type of criminal activity, ranging from burglary to homicide. Toolmarks may be encountered on many varied surfaces including wood, metal, and even human tissue; therefore, all cases and many surfaces should be considered for potential toolmarks.

The examination of toolmarks involves an attempt to associate a particular toolmark with a particular tool, through microscopic study, to the exclusion of all others. Toolmark examinations also include identification of objects which forcibly contacted each other, were joined together under pressure for a period of time and then removed from contact or were originally a single item before being broken or cut apart.

CAPABILITIES AND SERVICES

Examination of the Toolmark Prior to the Recovery of a Suspect Tool

The laboratory can provide valuable investigative information to the investigating officers through the careful examination of the toolmark. The possible determinations are as follows:

1. Type of tool used (class characteristics)
2. Size of tool used (class characteristics)

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3. Unusual features of tool (class and/or individual characteristics)
4. Action employed by tool in its operation
5. Most importantly, examination can determine if the toolmark is of value for identification purposes

Examination of the Suspect Tool with a Toolmark

The tool will be examined for foreign deposits such as paint or metal for comparison against the marked object. This trace evidence may help to associate the tool with the marked surface; however, the trace evidence in these circumstances usually provides class characteristic evidence.

After the examination for foreign materials, class characteristics are compared to establish consistency. Finally, several test marks are made with the suspect tool, and microscopic comparisons of the test against the questioned toolmark are made. Three possible conclusions may be reached:

1. That the tool produced the toolmark
2. That the tool did not produce the toolmark
3. That there are not sufficient corresponding individual characteristics between the known and the unknown to determine if the tool did or did not produce the mark

COLLECTION GUIDELINES

ITEM - Toolmarks

METHOD - If the object bearing the toolmark is reasonably mobile, bring the entire object to the laboratory. Protect the toolmark area by covering it carefully with paper; however, always consider latent fingerprints when packaging. If the object is particularly large or is completely immobile, the toolmark area may be cut out (depending on the situation, e.g., security considerations and damage to property) or cast using a suitable casting material. Package the toolmark cast in a rigid container (such as a pill box), properly seal and label. Include mid-range or orientation photographs, sketches and reports.

DO NOT place suspect tool into toolmark as it could destroy markings.

DISCUSSION - The actual toolmark is preferred over a cast of the toolmark; therefore, the microscopic marks need to be protected to provide the best possible results. Placing the tool into the toolmark may destroy microscopic detail. Submission of photographs, sketches and reports may help the examiner determine the action of the tool.

ITEM - Tools

METHOD - Package in a manner to protect the working end of the tool (e.g., on a screwdriver place a paper fold over the tip). After the working end has been protected, place in a rigid container.

COLLECTION GUIDELINES

ITEM - Items to be examined for fracture match (examples: broken tools, glass, vehicle parts, etc.)

METHOD - Package in a manner that will protect the edges of the items to be fracture matched. For example, when submitting glass, wrap and package each piece separately and clearly label and seal. In the request clearly indicate which items should be compared. For fragile items such as paint, a rigid container cushioned with tissue is probably best.

DISCUSSION - The edge will contain the areas to be fracture matched. If these areas are damaged it may prevent any possibility of a successful match.

MISCELLANEOUS PRESSURE OR CONTACT EXAMINATIONS

These examinations may make it possible to associate any two objects that were in contact momentarily or for more extended time

Number Restorations

Serial numbers provide a means of identifying and tracing items of equipment, vehicles, guns and other products using this form of identification. The numbers or letters are stamped into an appropriate metal surface, compressing the molecules beneath the die strike. Serial numbers can be obliterated using several different techniques, such as scraping, grinding, punching or filing. Usually the perpetrator obliterates the number sufficiently only to make the number invisible.

The compressed molecules are often still present under the obliterated area. The obliterated area is first prepared for the restoration process where possible or practical. This usually involves polishing the surface with an abrasive material to remove the grinding marks, gouges, etc. After the surface has been properly prepared, it can be treated in a number of ways that may make the number visible. The type of metal may dictate the most appropriate approach. For many obliterations, an acidic solution is swabbed over the polished surface. The acid reacts at different rates with the compressed molecules under the location of the die strike and the non-compressed molecules. Often this procedure enables the examiner to visualize and document the number in an appropriate manner.

COLLECTION GUIDELINES

ITEM - Obliterated Serial Numbers

METHOD - Protect the area needing restoration. Do not attempt to restore the number in the field.

DISCUSSION - The first attempt to restore the number is the most productive and further attempts will likely destroy the evidence.

LATENT FINGERPRINTS

Friction ridge skin is a unique and persistent arrangement of ridges and furrows found on the gripping surfaces of the hands and feet of each person. These impressions or "latent prints" can then be identified to the individual that left that impression through comparisons to a set of known prints.

The latent print section performs the following duties:

1. Process physical evidence for the presence of ridge detail and preserve ridge detail for further analysis.
 - Latent print processing consists of developing and recovering latent prints from items of evidence.
2. Compare ridge detail to known ridge skin from individuals associated with the case.
 - Any recovered latent prints will be reviewed by an analyst. The analyst then decides if the prints contain enough information for identification through the comparison process. Many areas of ridge detail preserved during evidentiary processing will not contain enough characteristics to establish identity.
3. Any unidentified ridge detail may be entered and searched through the automated search process.
 - Automated Biometric Identification System (ABIS), which is a computer system that searches prints against databases of known fingerprints.
4. At a minimum, routine analysis will be performed on items submitted where Latent Prints is the only service requested. The laboratory will seek to identify the individual(s) of interest at a minimum of once per submission, the processing and comparison for that case may cease at the analyst's discretion. If after analysis has been completed it becomes apparent that items not tested will require testing then, upon re-submission, these items will receive top priority at the laboratory.

Physical Evidence:

Physical evidence is anything collected at the scene of a reported crime. Various items can be conducive to latent print recovery.

Such items include, but are not limited to:

- Glass (bottles, pipes, windshields, mirrors, etc.)
- Plastic (scales, bags, baggies, plastic wrap, bottles, etc.)
- Paper (receipts, notes, etc.)
- Smooth metallic items (spoons, knives, weighing trays, firearms, etc.)
- Tape (smooth and sticky sides)

Considerations should be made regarding evidence that needs to be analyzed in other sections.

- **Controlled Substance:** Faster results will occur when separating the items needed for analysis in each section (controlled substances and latent print examinations). At a minimum on Items submitted for both Controlled Substances and Latents Prints; latent print processing will only be performed on items tested for controlled substances where the results were positive.
- **Firearms:** Latent print examinations will occur prior to any firearms analysis. Due to normal handling during firearms analysis, latent print recovery cannot be done after this occurs.

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- **Biology/DNA:** When an item requires both latent print and DNA analysis, biological screening is typically done prior to latent print examinations. Typically, smoother items (blades, slides of guns, etc.) are better for latent print recovery and textured surfaces (grips, handles, etc.) are better for contact DNA recovery. Some items are better suited for one examination or the other and will not have both types of processing performed, even when requested. The following items will not routinely have both contact DNA and latent exams conducted:
 - Casings/bullets – only latent print examination will occur
 - Condom wrapper – only latent print examination will occur
 - Unopened beverage containers – only latent print examination will occur
 - Beverage containers likely drank directly from – both exams are possible. If probative findings are obtained from either latent prints or DNA, the other analysis will generally not be performed
 - Cigarette packages – only latent print examination will occur
 - Cigarette butts (smoked) – only DNA analysis will occur
 - Unsmoked cigarettes – neither examination will occur

Collection Guidelines:

PLEASE WEAR GLOVES WHEN HANDLING EVIDENCE!

If you choose to field process (powder, superglue, etc.) your own items or scene, please take in consideration proper procedures and methods for these processes.

- Don't over powder.
- Use appropriate fingerprint lift tape.
- Gray prints will appear darker on white cards.
- Apply lifted print onto appropriate (usually glossy) side of card.
- Fill out the provided information (on most latent lift cards) concerning the case, date, location, and orientation of the latent.

In some instances, latent fingerprints can be developed at the crime scene. Dusting with powders and then searching with a flashlight is a simple and quick method for processing numerous items and areas at a scene. However, if any item of evidence is to be submitted to the laboratory for processing, it is best not to attempt any field recovery of latent prints prior to submission. Certain powders and other on-scene processes may interfere with the processing techniques utilized in a laboratory setting.

Common Dos and Don'ts:

- Don't attempt to process an item and then submit that item to the laboratory for further latent print recovery unless your facility has adequate equipment and conditions to process.
- Otherwise, if an item can be submitted to the laboratory for latent print recovery, please submit to the laboratory without any field or on-site processing.

Packaging:

- Tape-seals must accompany the outermost packaging of any item.
- Typically paper envelopes, brown paper bags, and cardboard boxes are adequate for most items.
- To reduce latent print evidence loss, properly secure an item into a container that minimizes movement, contact, and moisture.
- The packaging should be proportionate to the size of the item. In other words, larger items should be packaged in larger packages and smaller items should be packaged in smaller packages.

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Photography:

The latent prints should always be photographed with a scale. The scale is necessary for 1:1 (actual) size reproduction for comparison purposes. It is recommended that the scale include individual latent print identifiers.

The camera should be held perpendicular (at a right angle) to the latent print so that the lens plane and the print surface are parallel. Fill as much of the camera frame as possible with the print to maximize photographic detail.

Photography and powder lifter are not mutually exclusive. If a print is hard to photograph, do your best to lift the print. If a print will not lift, photography might be the only means of documentation. Vice versa, if you do not have adequate photographic equipment (i.e. high resolution, digital cameras capable of recording in .TIF or RAW format) a lift will be better than a low resolution photograph.

Submit all photographs and lifts from a scene to the laboratory via the laboratory request form. Due to proper chain of custody as well as size limitations in email attachments, all digital photographs must be submitted on a CD or DVD and as an item of evidence.

An analyst will review all photos and latent lift cards and will choose the photos and/or lift cards best used for comparison purposes.

Known Prints:

Known prints or known exemplars are friction ridge impressions from an individual intentionally recorded in a controlled manner using printer's ink or electronic scanning. The most common example of known prints is a ten print card. It is important for the submitting officer to verify if an individual has known prints on file with the State of Alaska or the FBI and to provide any identifiers (APSIN number, FBI number, name, date of birth, social security number, etc.) on the laboratory submission form. If an individual does not have known prints on file, the submitting officer will need to collect them and submit them to the crime laboratory.

JUST an individual's name is not adequate for recovering their fingerprint record. Many times there are individuals sharing a name. An examiner does not necessarily know "Joe SMITH" is associated with that case. Many times the AKDL number is not the same as the individual's APSIN number.

CONTACT INFORMATION: If you have any questions concerning the Latent Print section's examination capabilities, evidence handling procedures, case status, reports, or discovery information, please contact the Physical Section supervisor David Kanaris at 907-269-5621 or via email at david.kanaris@alaska.gov.

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CRIME SCENE RESPONSE

INTRODUCTION

The Crime Scene Unit (CSU) has been established to respond to calls for crime scene assistance requests from law enforcement agencies within the state. Forensic scientists stationed in Anchorage provide technical support to agencies in the documentation, collection and processing of evidence at crime scenes. Services performed by Crime Scene Unit Forensic Scientists include:

- Crime scene processing
- Vehicle processing
- Field processing
- Latent print processing

GOALS AND OBJECTIVES

The goal of the crime scene program is to aid and assist law enforcement throughout the state of Alaska in the investigation of violent crimes. The CSU will respond to requests by the Alaska Bureau of Investigations (ABI) for all major crime scenes and other law enforcement agencies as warranted by circumstances and resources. Law enforcement agencies are encouraged to utilize Forensic Scientists for physical evidence collection, evidence processing, training, information sources, and laboratory utilization questions. With the exception of digital evidence, the CSU will not routinely transport evidence from the 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, note-taking and assisting the agency with diagrams.
- Providing the requesting agency with a written report.
- Providing expert testimony.

Response CRITERIA

Criteria to Respond:

- Death investigations (except traffic fatalities)
- Sexual Assaults
- Assaults/shootings involving a law enforcement officer
- Other crimes as warranted by circumstance and resources

Criteria for Non-Attendance:

- At a simple scene where verbal directions on evidence collection and preservation can be given to a case officer/investigator.

CALLOUT PROCEDURE

Crime Scene Response Guidelines:

The following are the guidance criteria to be considered by the Crime Laboratory Crime Scene Supervisor in evaluating calls. These criteria are obviously not exhaustive and consideration of appropriate response

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will depend both on the nature of the case, the needs of the requesting agency, and the availability of technicians. 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 otherwise legal permission to examine the scene.

Forensic Scientists will only process scenes that are secured and protected by the investigating law enforcement agency.

Contact Information:

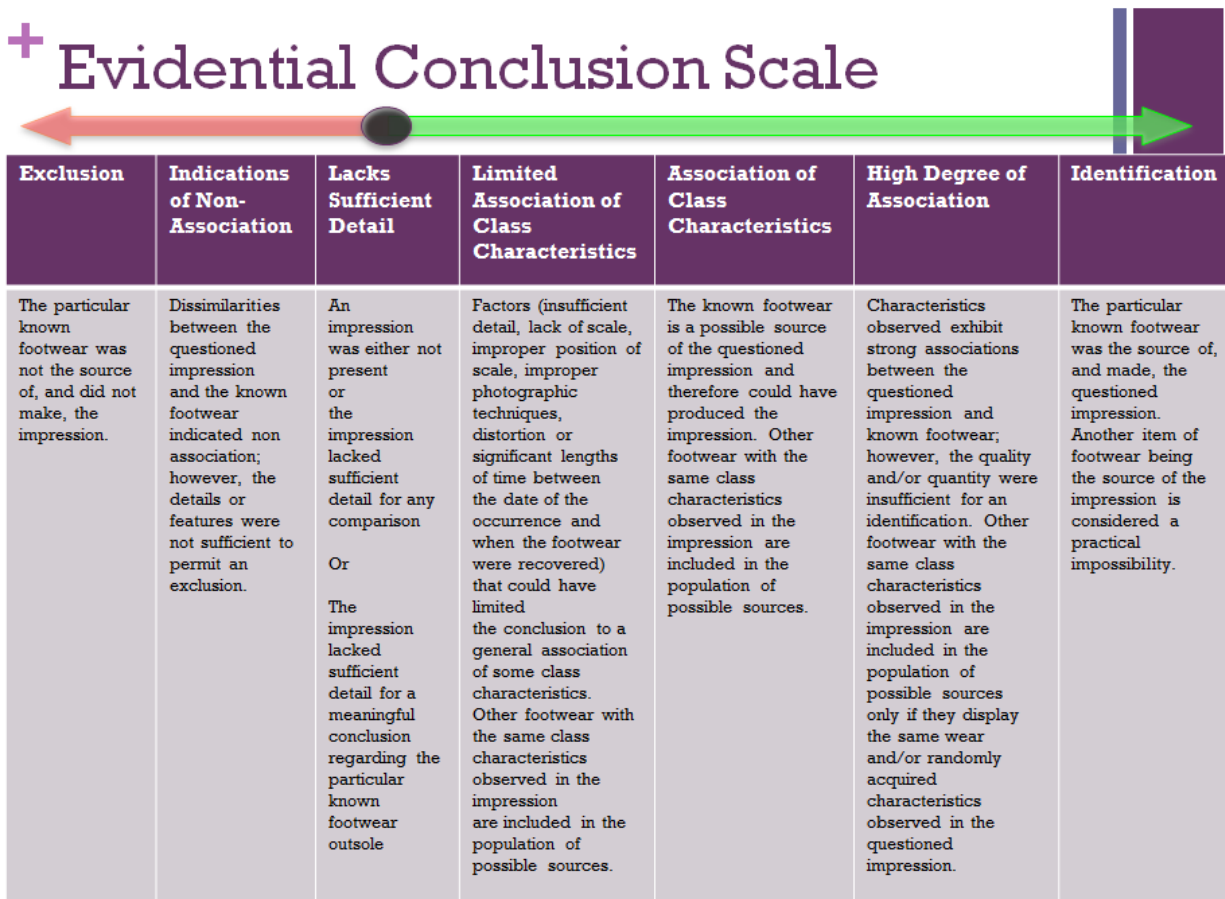
The requesting law enforcement agency can request assistance from the CSU in one of the following methods:

- Contacting the Alaska Bureau of Investigations. All major crime scene response will be requested through the Alaska State Troopers, Alaska Bureau of Investigations.
- Calling 907-717-6161 to request assistance.
- Contact the Physical Section supervisor David Kanaris at 907-269-5621 or via email at david.kanaris@alaska.gov.

The Crime Scene Unit will communicate with the requesting agency to assess the agency needs and determine the level of response.

FOOTWEAR

Footwear impressions are one of the most underutilized evidence types. They are present at practically all crime scenes and can be recovered from a number of different surfaces. They don't necessarily have to show the whole footwear impression to be of value to the forensic scientist. The scientist is only concerned with the quality/level of detail in the impression. Hence a partial impression on a smooth hardwood floor that is recovered with a gel lifter may be of more use than the full length impression in snow outside the property. This is important to remember at the crime scene – it is better to spend your time searching for a better quality footwear impression using oblique light than submitting the first impression that you see. At the laboratory the shoes from a suspect can potentially be identified or excluded as having made a crime scene impression. If the laboratory is unable to make a definitive statement during the comparison the shoes can be linked to the crime scene impression by degrees of association.



Crime scene impressions have the potential to yield certain fast-track intelligence; manufacturer and design searches. When you find a footwear impression at a crime scene you may email an image of this impression to dps.footwear.intelligence@alaska.gov along with pertinent information (location, date of offence, offence type and anything else that you feel is relevant to the case). These impressions will then be searched through an online database ARC (Alaskan Reference Collection) which has over 34000 sole

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designs on it. If the sole design is found on the database an intelligence report will be generated by the laboratory and emailed to the submitting officer. This service aims to return a result as quickly as possible to aid the officer in the collection of known footwear. The photograph that the attending officer takes is subject to all the usual requirements for crime scene photography of footwear impressions (L shaped scale placed in same plane as the footwear impression, camera perpendicular to the impression, fill the frame with the impression, obliquely light the impression).

Scene Preservation

The first thing an attending officer should do once they have secured the scene is to preserve areas where the suspect could possibly have stepped. Many footwear impressions may not be immediately visible therefore entries and exits should be preserved for potential impressions. Traffic at the crime scene should be kept to an absolute minimum and where necessary the officer should use stepping plates or walk close to walls. If a footwear impression is located outside efforts should be taken to preserve the impression from the elements prior to suitable recovery. Every person who attends the crime scene should have an elimination footwear impression taken. This impression can be anything from a photograph of the sole design, an inkless pad (Identicator) impression or a piece of aluminum foil that is stepped into on a smooth soft surface. Each elimination print should have the identifiers of the person attached.

Recovery

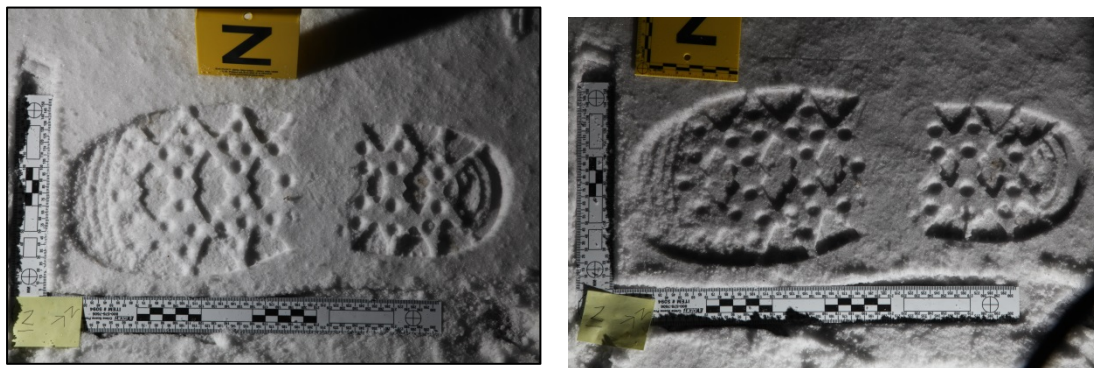
Wherever possible the officer should submit the physical item bearing the footwear impression to the lab for recovery. Often times this is not possible so the officer must evaluate the impression and decide on the best course of action. The first decision what type of impression is present, this can generally be broken down into 3 categories – 3D, 2D and latent.

Photographs

3D footwear impressions in snow, sand, mud, dirt are one of the most visible evidence types especially in a climate such as Alaska's. Before attempting to recover any 3D impressions a series of photographs should be taken, these will complement any casts and document the impression in its original state, just in case the impression is destroyed during recovery. Before taking any photos any loose debris (that may have accumulated there after the impression was deposited) can be removed from the impression. Anything that is embedded in the impression, however loosely, should be left in place. Comprehensive photography of the crime scene including overall and mid-range photographs (including placards) should be taken. A close up photograph should then be taken from a 90° angle. The photo should ideally be taken using a tripod to ensure that it is perpendicular to the impression. The impression should fill the frame; this means the length of the footwear impression should be fill the widest dimension on the screen of the camera. An L shaped scale should be placed next to and in the same plane as the impression. If the impression is 6" (15cm) down in fresh snow, you should dig a small trench 6" down next to the footwear impression (taking care not to cave the sidewall into the impression) and place the scale in it. Experiment with light from different angles to best illuminate the impression, around 10-20° usually works best. Take

at least three photos using light from different sides as they will show different details within the impression. The placard number should be visible in the photograph.

If the impression is in snow/ice introducing contrast will help to get a better photo. To do this spray snow print wax or spray paint at a shallow angle around 6-10" (15-25cm) from the impression. A thin coat and oblique light will give the best results.



Casting

Once you have taken the necessary photographs move onto casting the impressions. Casts and photographs together is the best combination with 3D impressions. Photographs alone will only tell half of the story, likewise with just casts. They show different details to the forensic scientist. For impressions in snow it is recommended that you use snow print plaster. This comes in three pre weighed bags together with a mixing tub. Pour in pre chilled water up to the fill line. Sift in the powder and stir constantly for around 45secs-1min. When the mixture has the consistency of paint pour into the impression from a height of no more the 3" (7cm) (to avoid destroying the impression). The mixture sets very quickly and so to take care not to leave it too long when stirring and before pouring. Once the mixture is on the impression wait around 1min and lightly etch the item#, your initials and which direction north is into the back of the cast. After around 5mins you can check to see if the cast is ready to pulled up by gently tapping on it. If it feels hard and no longer wet it is ready. Gently slide your finger in under the cast and lift. If the impression is in very wet snow/ice or there is excess water accumulated in the bottom of the impression you can sift a little of the powder into it before casting. For all other 3D impressions dental stone is an adequate casting medium. Weigh out approximately 2lbs (1kg) into a zip lock bag. Pour in approximately 10oz (300ml) water and mix thoroughly making sure to get all pockets of powder out of the corners of the bag. When the mixture is the consistency of pancake batter cut one corner off the bag and gently pour the mixture into the impression for a height of less than 3". After around 5-10mins the cast should be sufficiently dry to etch in the details as above. Dental stone casts take significantly longer to dry than snow print plaster 30mins-1hour depending on the weather. Once it is dry gently pull the cast by digging a small trench next to the impression and sliding your fingers in under the cast. To clean the cast it must be completely dry. This can take up to 24hours for dental stone. Run the cast under warm water and use a coarse brush to remove any excess mud or dirt. Before you reach the surface of the

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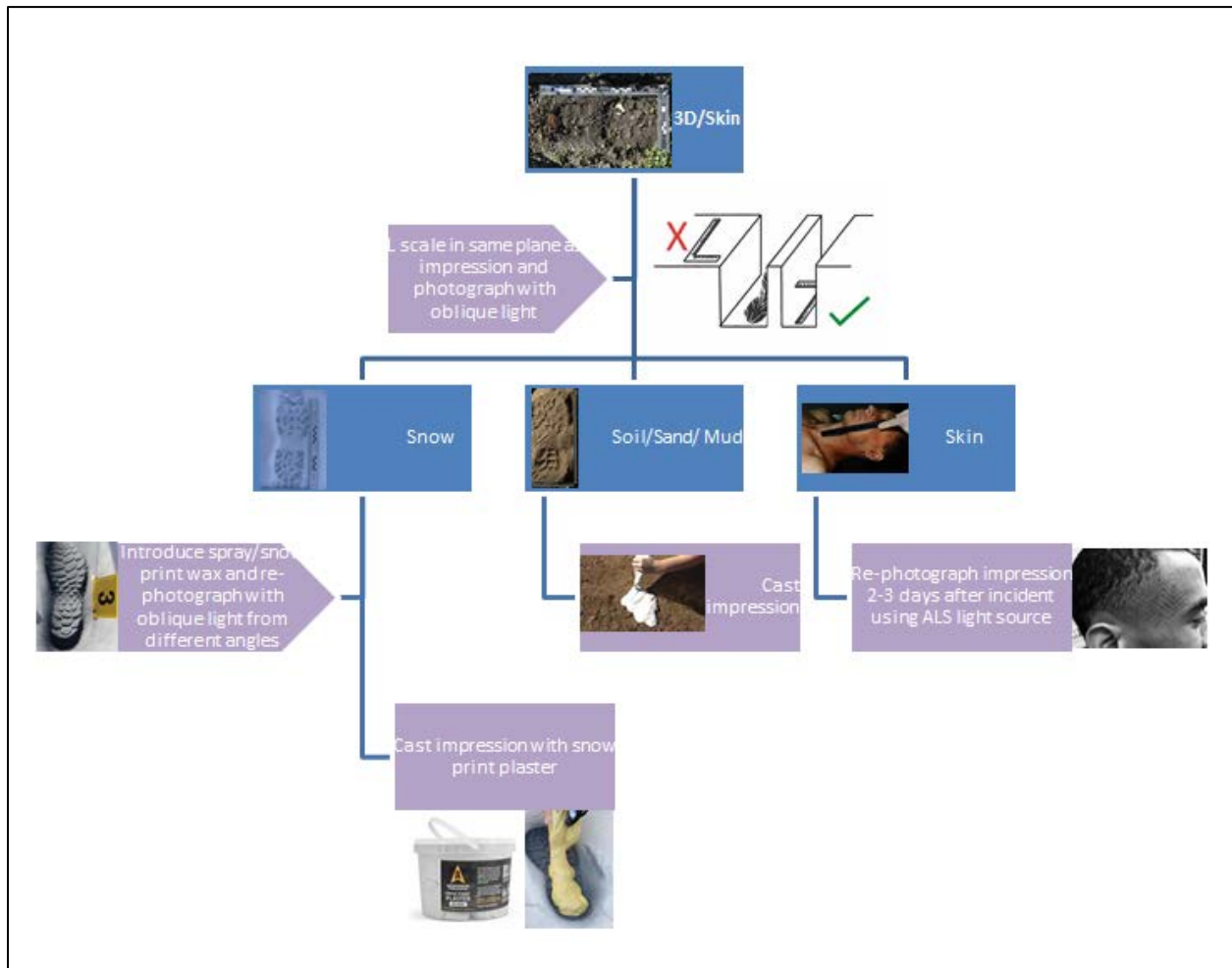
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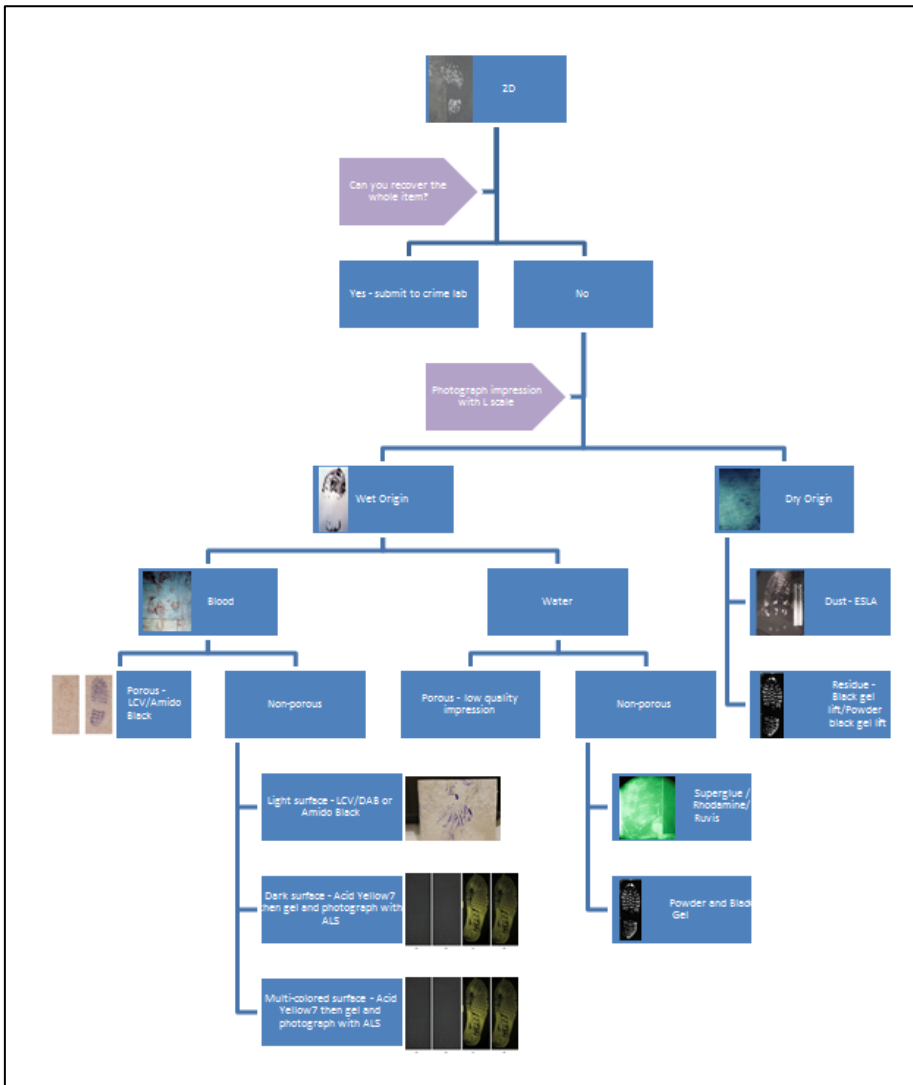
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impression stop using the coarse brush. Small amounts of dirt can be removed at the laboratory. To submit the casts. Securely affix inside an evidence box using zip ties. Snow print plaster is not as strong as dental so use more zip ties than you think necessary and make sure not to pull them too tight.

Footwear impressions can occur on skin if a victim has been kicked or stamped on with sufficient force. Even if bruising has not developed yet sometimes an impression can be developed on the inside surface of the clothing. Take a photograph with a scale in the same plane as the impression. Often the full extent of the bruising does not develop for a few days after the incident so if possible re-photograph (including a scale) 2-3 days later. An alternative light source/Quaser may bring out details previously not visible.



2D impressions



Two dimensional impressions can be recovered from virtually any surface. For wet or residue impressions the main recovery tool is going to be a black gelatin lifter. Locate area of impression, photograph with scale and light as described above. Gently peel back acetate cover and wait a few moments for gel to return to natural size, starting at one end of the impression lay gel down, gently roll out air bubbles, peel up and re-photograph with oblique light and scale. Cover gel with acetate sheet and submit to lab.

In very dry conditions an electrostatic lifting apparatus (ESLA) often outperforms a gel lift. Cut an area of ESLA foil to fit the area of the impression. Lay foil over impression black side down. Place electrostatic lifter with ground points on grounding plate and charging point on film. Turn on and roll out using a wooden or rubber roller. Make sure not to touch foil or surrounding area while

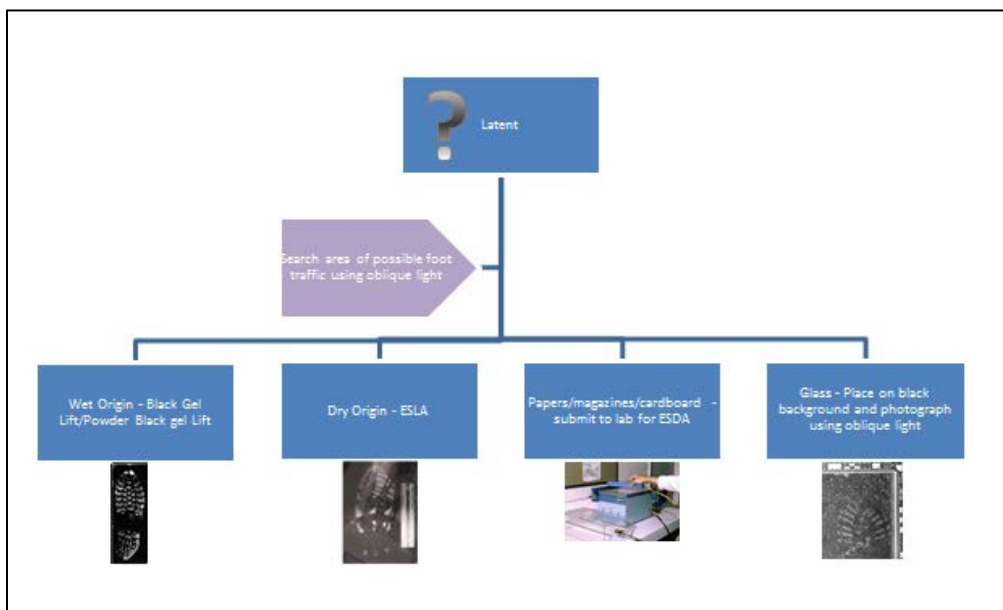
charging. Turn off ELSA. Leave for a few moments for charge to dissipate. Peel up foil and examine using oblique light. Photograph with scale and tape into clean flat box. Submit to lab. NB ESLA lifts are very fragile, exposure to dusty environments, physical contact and packaging in static inducing containers (plastic) will destroy the lift.

Impressions in suspected blood can be enhanced using a variety of chemicals depending on the surface they are left on. Please contact the lab to discuss enhancement/recovery. Please note that the most visible impressions are often not the best for analysis. Fainter impressions often reveal much more detail upon chemical enhancement.

Latent impressions

Often the highest quality footwear impressions are the ones you cannot see initially. A thorough search of an area with an oblique light is the best way to determine if there may be an impression present.

If there are papers/envelopes/magazines/cardboard present that may have been stepped on by a suspect these can be collected and submitted where they will be enhanced using an electro static detection apparatus (ESDA). Entryways and harder surfaces can be speculatively searched using the ESLA device and up to 3ft sections of film as described above.



SERVICES NOT CURRENTLY OFFERED

Analysis of Abrasives, Adhesives, Audio, Explosives, Fibers, Glass, Questioned Documents, Fire Debris and Tire Treads is not currently available at the Alaska Scientific Crime Detection Laboratory. The FBI does provide these services and others to investigative agencies at no cost. For submission guidelines please consult with the FBI (<http://www.fbi.gov/about-us/lab>)

Urine Analysis

In some instances analysis of urine for the presence of impairing substances is required by an investigative agency. The Alaska Scientific Crime Detection Laboratory is not able to accept these samples for analysis. For State agencies, the current contract laboratory for these samples is NMS Laboratories.

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ADMINISTRATIVE FUNCTIONS

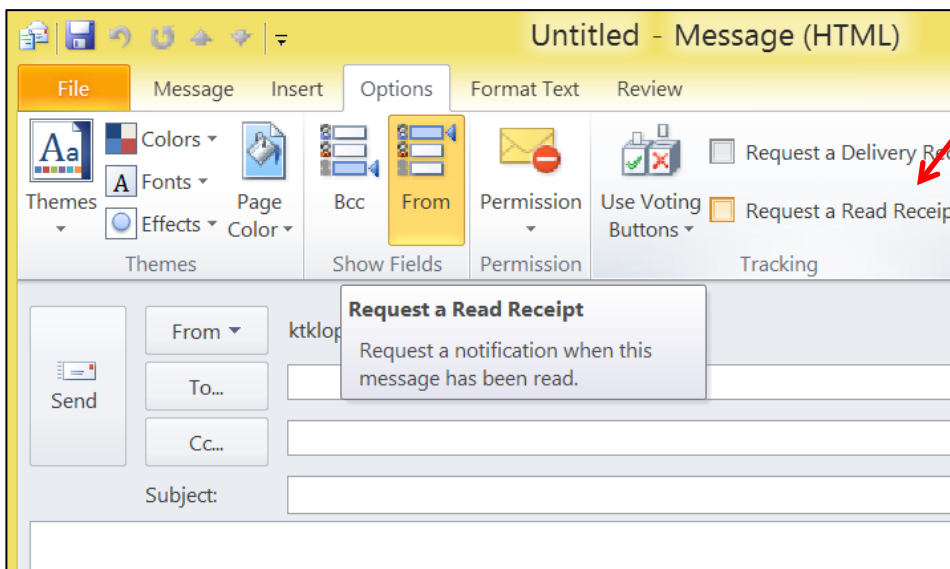
Submitting subpoenas

The State Crime Lab will no longer be returning served confirmation for all subpoenas submitted July 1, 2015. Please review the how to submit subpoenas with a read return receipt which will count as your served confirmation.

When you send your subpoena into the Crime Lab, send directly to the analyst(s) being served and Cc the Lab Admin email account.

To: "Analyst's E-mail" <- Insures quickest delivery of subpoena to analyst(s)

Cc: "dps.scdl.admin@alaska.gov" <- Allows admin staff to file subpoena for lab employee.



On an outgoing Subpoena e-mail select, "Request a Read Receipt"

ORDERING FORENSIC KITS

Blood and beverage alcohol kits

Blood alcohol collection kits and home brew collection kits are provided to Alaska law enforcement agencies. Requests for kits should be sent to dps.scdl.toxicology@alaska.gov.

DNA Database Collection Kit

These kits are exclusively for use in collecting the statutorily mandated samples from arrestees and convicted offenders. The kit contains instructions for the proper collection of the samples (buccal swabs and thumb prints) and completion of the information card. These kits are NOT for use in collection of the required known/reference samples for a criminal investigation. Kits are available for law enforcement officers, requests for kits should be sent to dps.crime.lab.web@alaska.gov.

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Note: DOC employee's please follow up with your Department Supply Section for DNA Database Collection Kits.

Sexual Assault Evidence Collection Kit (SART kit)

A kit used for the recovery of physical evidence from the body of the potential victim or suspect of an alleged sexual assault. A specialized kit exists for pediatric victims. The kit contains supplies to recover foreign secretions and trace evidence (i.e., hairs) from the body. In addition, the kit contains supplies for the collection of a known sample from the individual for comparison with the foreign secretions and hairs. Kits are available for law enforcement officers and hospitals, requests for kits should be sent to dps.crime.lab.web@alaska.gov.

COURT TRAVEL

Employee Testimony

Department of Law will arrange and cover lab employee airfare expenses for court testimony and the lab will cover lodging, per diem, and ground transportation when applicable.

WSP Toxicology Testimony

The Alaska State Crime Lab will arrange Washington State Toxicologists travel for court testimony.

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REVISION HISTORY

2017 R0	2017 R1	Location	Revision made
-	-	all	Corrected spelling, grammar, and spacing as needed throughout the document
28	-	Latent Fingerprints	Under 1. removed "Analysts and technicians in the latent print section process latent print evidence. If a technician works a case and documents latent prints, a "Latent Print Processing" report will be issued. This will not mention any comparisons or identifications. "
28	28	Latent Fingerprints	Under 3. Changed "Fingerprint" to "Biometric" and "AFIS" to "ABIS"
28	-	Latent Fingerprints	Under 3. Removed the second bullet point
31	31	Crime Scene Response	Under Goals and Objectives removed "They are intended to be a first line of forensic support for officers in the field, to help ensure that the best the state has to offer in the field of forensic science has been applied to evidence associated with a crime." and added "With the exception of digital evidence, the CSU will not routinely transport evidence from the scene."
31	31	Crime Scene Response	Under Response Criteria, changed "The CSU will respond to the following situations: " to "Criteria to attend:"
31	-	Crime Scene Response	Under Response Criteria, removed "The Crime Scene Unit will process vehicles that are brought to the Anchorage Laboratory garage by a law enforcement agency. Standard crime scene response criteria do not need to be met and can include any felony offense."
-	31	Crime Scene Response	Under Response Criteria, added "Criteria for non-attendance: At a simple scene where verbal directions on evidence collection and preservation can be given to a case officer/investigator."
32	-	Crime Scene Response	Removed the criteria to attend immediately and non-attendance sections.
32	32	Crime Scene Response	Under Contact Information changed "Crime Scene Supervisor" to "Crime Scene Unit" in the last sentence.
33 - 34	-	Crime Scene Response	Removed "Relationship to Requesting Agency" and "General Categories of Evidence Processing" sections