

## Firearm Identification Protocol

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### Standard Firearm Examination Methods

The examination of any firearm will include the completion of a Combination Firearm Short/Long Worksheet. The version used depends on the type of case involved. This worksheet will include the manufacturer's data of the firearm and will serve as a source to document the condition of the firearm as received and any tests performed on or with the firearm.

#### LISTED PROCEDURES

- Physical Examination & Classification of Firearms
- Safe Firearm Handling
- Unloading Firearms
- Pre-Firing Safety Checks
- Trigger Pull Examination
- Barrel and Overall Length Measurements
- Test Firing Methods
- Miscellaneous Firearm Examination Methods

#### SAFETY CONSIDERATIONS

These procedures involve hazardous materials, operations, and equipment. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Proper caution must be exercised, and the use of personal protective equipment must be considered. The firearm examiners and IBIS technician should be familiar with the CMPD Crime Laboratory Safety Manual.

These procedures may also involve hazardous materials to include evidence that may be contaminated with a biohazard. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Proper caution to include strict adherence to Universal Precautions and Blood Borne Pathogen safety must be exercised and the use of personal protective equipment must be considered to avoid exposure to any potential hazards.

Appropriate hearing and eye protection must be worn when applicable.

### PHYSICAL EXAMINATION & CLASSIFICATION OF FIREARMS

#### PROCEDURE

##### Choosing the version of the Combination Firearm Worksheet-

The version used will depend on the type case involved. In general, the long version may be used for any type case, but should be used for serious crimes that involve the shooting of a human, officer involved shooting cases, or cases where a malfunction or accidental discharged was alleged. The short version may be used when the case involves the "routine" analysis of a firearm in non-shooting cases such as armed robbery, drug cases, and city code violations. The short version may also be used in shooting cases for firearms not related to the shooting incident. During the course of an examination an examiner may find that they may need to change from the short version to the long, such as when serious malfunctions are encountered.

## Firearm Identification Protocol

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### Working the Case-

1. The worksheet should be filled out including all appropriate case and evidence information, which may include determining the following:

#### SHORT VERSION

Caliber/Gauge  
Make  
Model  
Rifling characteristics  
Serial number information  
Finish  
Firearm Type  
Operating condition  
Inventory of other submitted items  
Any other relevant data

#### LONG VERSION

Same information as Short Sheet plus:  
Safeties  
  
Type of action  
Barrel, overall length (if applicable)  
Location of extractor, ejector, firing pin  
Condition of bore  
Powder residues  
Examiner marks and their location

2. Each firearm should be engraved with the Firearm Number (F#) associated with that case and the examiner's initials
  - a. Normal cases – firearms should be marked on all mark-producing parts of the firearm (e.g., barrel, bolt, slide, etc.), or in the window of a revolver. An examiner will also have the discretion to only mark a firearm in an inconspicuous area, such as underneath the slide, when that firearm is deemed to be rare or have greater perceived value than more common firearms encountered.
  - b. CMPD issued firearms –
    - i. Pistols should be marked on the underside of the slide.
    - ii. Shotguns should be marked on the loading port.
    - iii. Rifles or other unlisted firearms should be marked in an inconspicuous place such as the ejection port or magazine well (to be noted on the worksheet).

NOTE: All notes, worksheets, photos, printouts, and any other hard copy documentation will be scanned and/or attached to the assignment in PLIMS for every case.

## SAFE FIREARM HANDLING

### INTRODUCTION

Firearm evidence in the laboratory environment is not dangerous if handled correctly and treated with respect. Occasionally, loaded firearms will be received. These, of course, need very special handling. **All firearms must be treated as though they are loaded.** This rule cannot be over stressed and must be followed at all times, whether it is in the Firearm Section, the shoot room, or in court. Safe firearm handling within the laboratory environment corresponds with safe firearm handling in general. The only way to prevent accidents is to practice safety at all times. In addition to the below listed considerations, the General Safety Practices in the Laboratory Safety Manual must be followed.

### PROCEDURE

The following safety considerations must be adhered to:

1. The muzzle of the firearm must always be pointed in a safe direction.
2. Presume the firearm you are about to handle is loaded until you have personally verified it is unloaded. This applies to any initial handling or any interrupted re-handling.
3. Prior to any examination, it must be verified that the firearm is unloaded.
4. Test firing or any examination of the firearm that utilizes live ammunition, or a live ammunition component, will only be performed in the shoot room or at the academy firing range.
5. When examinations are completed, firearms will be returned to the Property and Evidence Management Division in an **unloaded** condition.

6. Do not squeeze the trigger of a firearm unless its unloaded status has been verified.
7. Do not load a firearm unless and until it is to be fired or if performing cycling tests.
8. Firearms will ordinarily be received unloaded. However, if they are received loaded (due to rusting or other circumstances), they must be submitted in a steel-lined gun box.

## UNLOADING FIREARMS

### INTRODUCTION

Firearms are sometimes collected and submitted to the Property and Evidence Management Division in a loaded condition. This is normally in a locked, steel-lined gun box. Because there are a limited number of gun boxes in use by the CMPD, it is often necessary that the gun boxes be unloaded before the firearm is sent to the laboratory. Unloading is often accomplished by someone other than the examiner who ends up working the case. Because the initial condition of the firearm may become important at some time later, proper documentation of the firearm, as found in the gun box, is critical.

### PROCEDURE

1. Take possession of the firearm in PLIMS.
2. Find a location that is safe to handle a loaded firearm, typically the section's shoot room.
3. Employ proper personal protective equipment, as necessary.
4. Keep in mind that the firearm may be sent for DNA or fingerprint analysis at some later time.
5. Remove envelope or other packaging material from gun box.
6. Unlock and open gun box.
7. Use a Firearm Unloading Worksheet.
8. Note external features such as hammer position, location of magazine, any jammed ammunition components, safety positions.
9. For revolvers, mark the cylinder showing its position in the frame. Open the cylinder and note the location of each ammunition component as it is removed from the cylinder. It is a good idea to mark each ammunition component (with a marker pen) regarding its position in the cylinder. Make the appropriate notations on the worksheet.
10. For firearms with magazines, remove the magazine or empty tubular magazines.
11. Empty the chamber, noting its condition on the worksheet.
12. Complete the Firearms Unloading Worksheet.
13. Verify that the firearm is completely unloaded.
14. Package the firearm and components properly.
15. If the case is not being worked at that time, place the Unloading Worksheet in the box with the evidence. The Unloading Worksheet will also be scanned and attached in PLIMS under the CASE INFO tab.

## FIREARM TRACKING FOR CMPD

G.S. 15-11.1, which was passed by the NC legislature, says that beginning October 1, 2013, firearms may not be destroyed by the recovering agency unless it “does not have a legible, unique identification number or is unsafe for use because of wear, damage, age, or modification.”

- a. Therefore all firearms examined in the Firearm section or test fired by the firearm technician are tracked via the **Firearm Tracking for CMPD Database** and will be entered into this database by the firearm technician or firearm examiner. The test fires from IBIS-eligible firearms will be submitted for acquisition into the IBIS/NIBIN. In the **Firearm Tracking for CMPD Database** the IBIS technician will check the IBIS entered box and enter the date of IBIS entry into the relevant field. The IBIS technician will also check to make sure that the firearm examiner or firearm technician has filled out the information in the tracking database and if they have not, advise them to do so.

## PRE-FIRING SAFETY EXAMINATION

### INTRODUCTION

It is the responsibility of the firearm examiner to ensure that all appropriate safety function checks are performed on a firearm prior to test firing. Following is a list of safety checks that shall be considered. The examiner must be mindful that individual case situations may require a more extensive function test process than that which is listed here. **NOTE: No firearm which is deemed to be unsafe by the examiner will be test fired unless absolutely necessary for comparison purposes.**

### PROCEDURE

- I. Deciding whether or not a firearm can be safely test fired from the normal handheld position.
  - A. The Recall/Safety Warning List for Firearms and Ammunition, which can be found in the Members Area under Databases on the AFTE website, may be consulted for each firearm. Due to their significant history of malfunctions special care will be taken with Lorcin, Bryco, or Cobra Enterprises firearms. If any indication of a problem is found, these or any other pistols will be fired using the Ransom Rest. If no malfunctions are encountered upon inspection and dry firing of a long gun, the gun may be shoulder fired into the tank. If any indication of a malfunction or alteration to the action of the firearm is found, the long gun will be fired in the long gun rest. If a malfunction occurs, consult with the section administrator for further direction.
  - B. Are the chamber & bore clear?
  - C. Are there any signs of cracks or weaknesses in major parts of the firearm; such as the frame, slide or barrel?
  - D. Does the firearm function, lock-up or dry fire as you would expect it to?
  - E. Is the correct ammunition being utilized?
- II. Is it appropriate to utilize the evidence ammunition?
  - A. Are there signs of reloading? *If so, reconsider the need to test fire the evidence ammunition.*
  - B. Are there splits in the cartridge case neck and/or other significant damage to the cartridge case?
  - C. Is the ammunition of the correct caliber? *This assessment of caliber cannot be based on the head stamp!*
  - D. Are there existing toolmarks on pertinent surfaces of the ammunition?
  - E. Is the ammunition needed for other tests; i.e., range determinations?
- III. Muzzle Loaders
  - A. Does the chamber/barrel appear sound?
  - B. Do the percussion nipples have oversize flash holes?
  - C. If a black powder firearm is received in the loaded condition, it must have the bullet and charge removed, if possible. It may then be properly loaded prior to test firing.

- D. Is this an "original" muzzle loader or a modern reproduction? "Originals" must always be remotely fired.

### INTERPRETATION OF RESULTS:

If the above considerations lead to any question regarding the safety of the examiner and the problem cannot be rectified, the firearm should not be test fired. If test firing with other than a primed case is absolutely necessary, that firearm must be remotely fired.

## TRIGGER PULL EXAMINATION

### INTRODUCTION

One of the examinations that may be conducted is determining the trigger pull of a firearm. Trigger pull is defined as the amount of force that must be applied to the trigger of a firearm to cause sear release. This examination can provide information regarding the mechanical operating condition of the firearm. The trigger pull of a firearm can be obtained using hanging weights which make contact with the trigger at a point where the trigger finger would normally rest. The trigger pull test may be performed when requested by the investigating officer or when a malfunction is alleged. When these parameters are not in effect, the examiner may use their training and experience to determine whether or not the trigger pull is within the "normal" range (neither excessively high nor excessively low during dry firing) for that firearm. When this is the case they may enter that result on the firearm worksheet.

### PROCEDURE FOR HANGING WEIGHTS

- I. EQUIPMENT: Arsenal (hanging) weights.
- II. TECHNIQUE:
  - A. SINGLE ACTION TRIGGER PULL
    1. Ensure that the firearm is unloaded.
    2. Cock the firearm.
    3. Hold the firearm with the muzzle pointed generally upward.
    4. Rest the trigger hook of the arsenal weight hanger on the trigger where the average finger would normally rest, making sure it is not touching any other part of the firearm.
    5. Slowly add weights until the sear releases. Note the weight when the sear releases.
    6. Check two or three times, resetting the sear connection after each attempt. Record the lightest weight necessary for sear release. Note any cylinder position on a revolver where the trigger pull is not uniform with the rest of the positions.
  - B. DOUBLE ACTION TRIGGER PULL
    1. Ensure that the firearm is unloaded.
    2. Hold the firearm with the muzzle pointed generally upward.
    3. Rest the trigger hook of the arsenal weight hanger on the trigger where the average finger would normally rest, making sure it is not touching any other part of the firearm.

4. Slowly add weights until the weights pull the trigger through the double action sequence and the sear releases. Note the weight when the sear releases.
5. Check two or three times, resetting the sear connection after each attempt. Record the lightest weight necessary for sear release. Note any revolver cylinder chamber that alters the trigger pull.

### INTERPRETATION OF RESULTS:

The results acquired are only an approximation and a different technique may lead to a different trigger pull weight. The trigger pull is normally recorded to the nearest 1/2 pound. Results reported will be based on the examiner's training and experience and may include the use of databases available to the examiner that contain the measured trigger pulls of various types of firearms. The reported result will state that the force required to activate the trigger is within, above, or below the normal range for the type of firearm in question rather than a numerical value.

## BARREL & OVERALL LENGTH MEASUREMENT

### INTRODUCTION

One of the examinations conducted in this section is determining the barrel length and in some cases the overall length of a firearm. Barrel length is defined as the distance between the end of the barrel and the face of the closed breech block or bolt for firearms other than revolvers. On revolvers, it is the overall length of the barrel including the threaded portion within the frame. Barrel length normally should include compensators, flash suppressors, etc., only if permanently affixed. Overall length of a firearm is defined as the dimension measured parallel to the axis of the bore from muzzle to a line at right angles to the axis and tangent at the rearmost point of the butt plate or grip. Removable barrel extensions, polychokes, flash suppressors, etc., are not part of the measured barrel length or overall length.

For all "measurements that matter\*" the examiner will use the firearm measuring box, which incorporates a ruler with a certified traceability to the International System of Units. [*\*These measurements are defined as measurements where the testing contains measurement results that are quantitative, reported and may reasonably be expected to be used, by an immediate or extended customer (anyone in the judicial process) to determine, prosecute or defend the type or level of criminal charge(s).*] For other measurements it is permissible to use a standard ruler or yardstick.

### PROCEDURE

Care must be taken if any object is placed down the barrel to aid with the measurement. Due to the nature of the laboratory's barrel measuring rods this test should be done only after all tests fired for comparison have been obtained.

#### I. EQUIPMENT:

- A. Firearm measuring box, and (if necessary)
- B. Barrel measuring rod.

#### II. TECHNIQUE:

##### A. BARREL LENGTH:

##### 1. REVOLVERS:

Measure the distance from the breech end of the barrel to the muzzle, excluding the cylinder. This measurement can be done directly or by placing a non-marring dowel down the barrel,

## Firearm Identification Protocol

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marking the distance from the breech end of the barrel to the muzzle and then measuring this item using the measuring device. **If the measurement falls between graduations on the scale, the measurement will be rounded up to the next 1/32 inch.**

### 2. FIREARMS OTHER THAN REVOLVERS:

Measure the distance from the breech face in a closed and locked and cocked position to the muzzle. This measurement can be done directly when possible or by using a measuring rod.

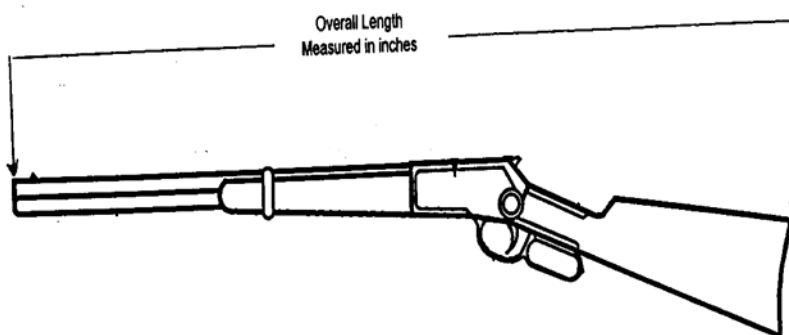
To use the measuring rod:

1. place the measuring rod down the barrel,
2. slide the

3. collar with the set screw to the longest part of the barrel,
3. tighten the set screw at that position
4. measure from the end of the rod to the edge of the collar using the firearm measuring box. **If the measurement falls between graduations on the scale, the measurement will be rounded up to the next 1/32 inch.**

### B. OVERALL LENGTH:

1. Firearms whose length exceeds the length of the measuring box will not be measured as the length is clearly above statutory minimums.
2. Place the firearm in the measuring box **with the bore of the firearm parallel to the side of the box** and one end of the firearm touching the frame of the box.
3. Move the sliding plate until it contacts the end of the firearm.
4. Measure the distance using the ruler that is in place in the measuring box.
5. **If the measurement falls between graduations on the scale, the measurement will be rounded up to the next 1/32 inch.**



### INTERPRETATION OF RESULTS:

Measurements that are to be reported must be obtained using a ruler with certified traceability. Other measurements will be considered only approximations based on the device used to obtain the measurements.

**If the measurement falls between graduations on the scale, the measurement will be rounded up to the next 1/32 inch.**

### MEASUREMENT UNCERTAINTY:

A study of measurement uncertainty (see Appendix C) was conducted in this laboratory. The uncertainty of measurement was determined be as follows:

For all cases where the barrel length is reported, the following format will be used:

**Measured barrel length +/- 3/16 inches (@ 95.45%, K=2).**

For all cases where the overall length is reported, the following format will be used:

**Measured overall length +/- 5/32 inches (@ 95.45%, K=2).**

**It should be noted that under both North Carolina and Federal laws, the barrel length for a rifle must be at least 16 inches. The barrel length for a shotgun must be at least 18 inches. The overall length for any rifle or shotgun must be at least 26 inches.**

## Test Firing Methods

### OPEN FILE (IBIS/NIBIN) PARAMETERS

#### PROCEDURE

For firearms that are test fired by a firearm examiner and that fit within the current IBIS parameters, at least **two** shots will be fired. Following entry of one of the tests into the IBIS, the tests will be retained in the laboratory's Fired Standards Reference Collection. For firearms that are test fired by a firearm technician, one shot will be fired. Following entry of that test into the IBIS, the test will be returned to the Property and Evidence Management Division.

For firearms that do not fit within the current IBIS parameters, a minimum of two shots will be fired for all cases where a comparison is to be made. These tests will be retained in the laboratory's Fired Standards Reference Collection.

If no comparison is to be made, the examiner may choose to fire test shots or do a "pencil test" to determine the operability of the firearm. If the firearm has already been test fired for IBIS/NIBIN, no tests need be retained.

If for any reason the examiner feels that more tests are necessary, additional test shots may be fired.

#### CURRENT IBIS PARAMETERS

Beginning January 1, 2014, the CMPD Crime Lab Firearm Section will follow the IBIS entry guidelines as set forth by ATF (Broadcast2\_Nov 2013).

- All suitable fired evidence cartridge cases and shotshells of applicable calibers (see below) will be entered into the IBIS.
- All **semiautomatic pistols** of any caliber for which ammunition is available will be test fired for entry into the IBIS. In addition, the following rifle calibers and shotgun gauge will be test fired:
  - 223 Rem/5.56x45mm NATO
  - 7.62x39mm Russ
  - 12 Gauge
  - new calibers or those that are being seen more frequently may be entered at the discretion of the examiner

## Firearm Identification Protocol

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- Any and all firearms will be test fired for comparison or operability purposes when necessary.

At this time the following are **NOT** accepted for IBIS inclusion:

- **Bullets of any caliber** (the original IBIS unit, which could acquire bullets, was removed on May 8, 2013)
- All shotgun gauges except 12 Gauge
- All rifle calibers except those listed above

## WATER RECOVERY TANK AND BULLET TRAP

### INTRODUCTION

In order to perform a microscopic comparison of a submitted firearm, a minimum of two (2) test shots should be fired and recovered. Recovery methods include the water tank and the bullet trap. The type of firearm and ammunition tested will usually dictate the type of recovery method used. The water recovery tank is usually used to recover bullets from handguns and rifles.

### SAFETY CONSIDERATIONS

One should be aware of the cartridge types/calibers that can be fired into the water tank, as well as the proper water depth needed for firing.

### PROCEDURE

1. If the bullets and cartridge cases will be retained, each should be marked with the laboratory case number (F#), the test number, and the examiner's initials.
2. The examiner should consider indexing and sequencing each shot, if necessary.
3. Proper hearing and eye protection must be worn.
4. Ensure that the water level is appropriate.
5. Ensure that the lid of the water recovery tank is closed.
6. Ensure that the exhaust system is turned on and running at full speed.
7. Ensure all warning systems are activated.
8. Load no more than two (2) cartridges into the firearm during the initial testing of the firearm.
9. Fire the firearm into the tube on the water recovery tank or into the bullet trap. If the firearm is capable of firing both single and double action modes, a minimum of one (1) shot per mode should be obtained.
10. Recover the bullets with the appropriate device if applicable.
11. Collect all ejected cartridge cases.

## REMOTE FIRING

### INTRODUCTION

## Firearm Identification Protocol

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During the course of examining a firearm, it may be determined that it would be unsafe for the examiner to fire the firearm by holding it as designed. If it is necessary to obtain test standards from this firearm, the firearm should be fired remotely. The long gun rest can be utilized for firing long arms and some handguns, while the *Ransom Rest* can be utilized for firing handguns.

### SAFETY CONSIDERATIONS

Due to the potential hazard of the firearm malfunctioning or undergoing a catastrophic failure, the examiner must be stationed behind a Plexiglas shield or at a safe distance from the firearm when discharging the firearm.

### PROCEDURE

1. The bullet, cartridge case, or shotshell of each test shot should be marked with the laboratory case number (F#), the test number, and the examiner's initials.
2. The examiner should consider indexing and sequencing each shot, if necessary.
3. Set up the chosen remote-firing device in front of the appropriate recovery system.
4. Place the firearm in the device. It is recommended that the examiner first dry-fire the firearm in the remote firing device before using live ammunition.
5. Proper hearing and eye protection must be worn.
6. Ensure that the exhaust system is turned on and running at full speed.
7. Ensure all warning systems are activated.
8. Load no more than one (1) cartridge into the firearm during the initial testing of the firearm.
9. Activate the remote device while standing behind a Plexiglas shield or while standing at a safe distance away from the firearm.
10. Obtain fired tests.

## DOWNLOADING

### INTRODUCTION

Due to the limitations of the Firearm Section's bullet recovery devices, it may be necessary to reduce the powder load of the cartridge in order to obtain a velocity suitable for safely collecting test standards for comparison purposes. Even with a reduced load, it may be necessary to fire the firearm remotely.

### PROCEDURE

1. Pull the bullet of the cartridge using an inertial bullet puller.
2. Remove existing powder.
3. Weigh the removed powder.
5. Weigh out the appropriate powder charge and place in the existing cartridge case.
6. Loosely pack a small piece of tissue into the case to fill the gap between the bullet and powder.

7. Seat the bullet back into the cartridge case using a rubber mallet or a reloading press.
8. A reduced load using 50% of the original powder can be used. It should be noted that great care must be taken when performing this type of downloading. 50% downloading CAN NOT be used with slow burning powders.

## PRIMED CARTRIDGE CASE / SHOTSHELL

### INTRODUCTION

During the course of examining a firearm, it may be determined that it would be unsafe for the examiner to fire the firearm as designed. If it is not necessary to obtain test standards for comparison purposes, the firing condition of the firearm can be tested using a primed empty cartridge case or shotshell.

### PROCEDURE

1. Obtain a primed empty cartridge case in the desired caliber or pull the bullet of a live cartridge using an inertial bullet puller, retaining only the primed cartridge case. For shotguns, obtain a primed empty shotshell in the desired gauge or cut open a live shotshell removing all components, retaining only the primed shotshell.
2. Proper hearing and eye protection must be worn.
3. Ensure that the exhaust system is turned on and running full speed.
4. Ensure all warning systems are activated.
5. Load the primed empty cartridge case or primed empty shotshell into the chamber of the firearm and test fire in front of the bullet trap or into the tank.
6. Repeat if the firearm has more than one action.
7. Collect and retain or discard all tests as necessary.

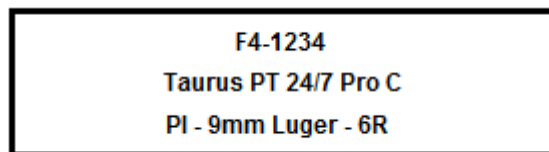
## RETENTION OF FIRED TESTS

### INTRODUCTION

Test bullets and cartridge cases should be retained in the Fired Standards Reference Collection (FSRC) file cabinets to be used for aid in determining type of firearm used in no-gun cases (comparison of class characteristics) or for future comparisons to fired evidence. Fired standards in the FSRC are retained for a period of no more than ten years. The tests are kept in the secure area of the Firearm section, where only those assigned to the section have access.

### PROCEDURE

1. Create a sample/child item from the original firearm item in PLIMS ensuring that the date, firearm data and "Collecting Officer" are correct.
2. Print the label for the child item and affix to slide box as illustrated below.



Box End

Side of slider box

3. Mark the end of the box with the F-number, firearm type code, GRC and make and model information as listed above.
4. Seal the box, initial, and date properly.
5. For IBIS applicable tests, transfer the item in PLIMS to the IBIS IN BOX and place tests in the designated area.
6. After entering the tests into the IBIS, the technician will reseal, initial, and date the test box, transfer the box to the FSRC in PLIMS and file the box in the FSRC file cabinet by F-number.
7. For non-IBIS tests, transfer the item in PLIMS to the FSRC and file by F-number.

### EVIDENCE vs. REFERENCE DESIGNATION FOR TEST FIRES

Test bullets and cartridge cases will be considered as evidence. Thus, each time the box is transferred to or from a location or person, it must be tracked in PLIMS. If a subsequent comparison becomes necessary, the analyst must sign the box out of the FSRC via PLIMS. Each time the box is opened it must be resealed with initials and date.

For fired standards that were fired prior to the use of PLIMS, if for any reason new tests cannot be produced (the firearm has been destroyed, returned or become inoperable, etc.), the FSRC may be used for comparison purposes. However, when this is the case, any statement of identification in the "Results" section of the report issued must refer to reference standards fired from a specific firearm. For example, "The evidence bullet Y was fired from the same firearm that fired the reference bullet that was fired from Firearm X". The statement, "Bullet Y was fired from Firearm X." would no longer be usable.

## Miscellaneous Firearm Examination Methods

### RUSTY FIREARM EXAMINATION

#### INTRODUCTION

Rusty firearms or those found in water, etc. may be submitted for examination. Immediate attention must be given to these firearms to prevent further damage. The examiner should instruct the person recovering the firearm in a fluid such as water, to submit the firearm in a container of the fluid. If this is not practical, the firearm can be sprayed with a product that displaces water. It should be noted that the firearm may be too rusted to be functional.

#### PROCEDURE

1. Determine if the firearm is loaded and if it is, unload the firearm, if possible. If the firearm is loaded or presumed to be loaded, proceed with extreme care. Make sure the firearm is not subjected to rough handling and that the muzzle is pointed in a safe direction at all times.

2. The examiner must determine to what extent restoring the firearm is necessary (i.e., for test firing, for recovering manufacturer information, serial number, etc.).
3. Soak the firearm in penetrating oil, derusting solvents, or similar material. This should be done in the chemical fume hood when possible. Check periodically until it can be opened and unloaded.
4. Periodically check the firearm until the firearm functions, or the desired information is recovered.
5. The firearm may also be cleaned with gun cleaning solvent and cleaning patches.

## SILENCER EXAMINATION

### INTRODUCTION

A silencer or sound suppressor is any device attached to the barrel of a firearm designed to reduce the noise of discharge. Silencers can be commercially produced or homemade. They are typically tubular metal devices, but may vary in shape or form. Even a 2-liter soda bottle can be used as a silencer.

### PROCEDURE

1. Examine device to determine if it is, or is characteristic of, a silencer or sound suppression device.
2. Examiner will document and record their findings.
3. The AFTE Journal archive has some articles that are very helpful in this area. (See References at the end of this section.)
4. Because of the calibration and maintenance issues involved, this laboratory will not conduct actual sound measuring tests using a sound meter. Therefore, a device should not be reported to be a silencer, but “is characteristic of” or “exhibits the characteristics of” a silencer or sound suppression device.

## MALFUNCTIONING FIREARM EXAMINATION

### INTRODUCTION

A firearm examiner may be called upon to examine a firearm to determine whether the firearm will malfunction. The majority of these cases deal with the question: "Could the firearm have fired without pulling the trigger?" In these examinations, it is the goal of the examiner to answer that question by thoroughly examining and testing the firearm. This may include internal and external examinations or striking or dropping the firearm in attempts to duplicate the actions of the firearm at the time of discharge. It is very helpful if the examiner has a detailed account of the incident and the shooter's description of the alleged malfunction before beginning this examination. The examiner should attempt to keep the firearm in the same condition as received. However, there may be times that the original condition of the firearm may be altered in attempts to determine the cause of the malfunction. During these times, the examiner must specifically document these changes in their notes.

### PROCEDURE

No one procedure can sufficiently outline the steps necessary to examine all firearms for any malfunction. However, the following list of examinations serves as a guideline for the examiner and may aid the examiner in their analysis.

- I. Physical Check (Condition of Firearm as Received):

## Firearm Identification Protocol

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- A. Cocked/uncocked
- B. Safety position
- C. Loaded/unloaded
- D. Cartridge position
- E. Stuck cartridges/discharged cartridge cases
- F. Presence and/or location of flares

### II. Visual Abnormalities:

- A. Barrel (loose, etc.)
- B. Receiver (condition)
- C. Slide (condition)
- D. Parts broken or missing especially;
  - 1. the firing pin,
  - 2. the ejector or
  - 3. the extractor
- E. Screws (loose or missing)
- F. Alterations or adaptations
- G. Sights

### III. Action (External):

- A. Are the relationships of the action parts correct?
- B. Is the assembly correct?
- C. Does the action lock normally upon closing?
- D. Cylinder rotation (securely locks).
- E. Hand relationship to the ratchet (worn).
- F. Trigger (not returning, sticks, broken spring, etc.)
- G. Check the trigger pull (single action, double action) and striking of hammer.

### IV. Safeties:

- A. 1/4, 1/2, full cock, seating check (any false seating positions, pull off/push off, etc.)
- B. Grip, magazine, disconnect: function
- C. Thumb/finger - note positions when firearm will fire
- D. Rebound hammer or inertia firing pin - Will firing pin ride on primers? Is firing pin frozen or bent? (Drop hammer several times to check above safeties.)
- E. Does the slide or bolt have to be completely closed to fire?
- F. Can the safeties be bypassed? Will dropping hammer bypass safeties? (This may require primed cartridge tests.)
- G. Will a light blow on the rear of the hammer, when it is in battery, discharge the primer?
- H. Is the firing pin impression off center (both single action and double action operation)?

### USE CAUTION WHEN FIRING LIVE CARTRIDGES OR PRIMED CARTRIDGE CASES

### V. Action Check:

- A. Check feeding (magazine, carrier or lifter, feed ramp, magazine lips, etc.).
- B. Will a cartridge fire on closing of the bolt or slide?
- C. Extractor and/or ejector markings on evidence cartridges/discharged cartridge cases consistent and/or normal?
- D. Unusual marks exhibited on the cartridges/discharged cartridge cases.

### VI. Check for any inherent "quirks" known about the particular firearm based on literature or case data.

### VII. Test Fire Firearm (note operation, misfires, etc.):

- A. Note any operational problems.
- B. Ammunition involved (proper cartridge, type, reloads, etc.).
- C. Check consistency of the impression on test and evidence.

### VIII. Special Situational Tests:

Discretion should be considered in situational testing if the force needed could disturb the internal action and/or cause changes which might prevent determining the exact cause of the malfunction.

### IX. Action (Internal) (remove side plate or partially disassemble):

- A. Hammer notch(s) (worn, burrs, dirt, etc.).
- B. Sear (worn, broken, burrs, etc.).
- C. Safeties (relationships and general parts relationship).
- D. Springs (weak, broken, altered, etc.).
- E. Signs of any tampering or faulty assembly.

## FIREARM REFERENCE COLLECTION

### INTRODUCTION

The Firearm Reference Collection is maintained by the laboratory for various scientific reasons, including:

- 1. To assist in identifying the make, model and source of an evidence firearm.
- 2. To provide exemplar firearms for various scientific testing purposes that might otherwise compromise an evidence firearm.
- 3. To provide an exemplar resource for the training of laboratory or other departmental personnel.
- 4. To provide a source of firearm parts for the temporary repair of evidence firearms for test firing purposes.
- 5. To provide a resource for the identification of firearm parts recovered at a crime scene.
- 6. To provide a resource for the location and style of firearm serial numbers.

### PROCEDURE

The Laboratory firearm reference collection will be maintained under strict regulations and controls. The Laboratory assumes all responsibility for security and control of these firearms.

- 1. Immediately upon receipt of a firearm for the reference collection, the custody of the firearm will be scanned to Firearms – FA Reference Collection in PLIMS and logged into the Reference Collection Database which is located on the departmental R: drive. This entry should include all fields in the database for which the information is known, including:
  - a. The exhibit number assigned.
  - b. The complaint number.
  - c. A description of the firearm (make, model, caliber, type).
  - d. The serial number of the firearm.
  - e. The date received.
  - f. The receiver's initials.
  - g. Any relevant remarks.
- 2. For firearms received prior to PLIMS, a property sheet will be signed for every firearm received for the reference collection. The respective exhibit number assigned to each firearm will be recorded on the property sheet copy. These forms will be maintained in exhibit number order.

## **Firearm Identification Protocol**

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3. The firearm reference collection will be displayed and maintained in such a manner as to prevent the firearms' deterioration and to facilitate their inventory, safety, and control. All firearms not stored in the display at the entrance to the section will be stored in the firearms vault.
4. All firearms received for the reference collection will have their assigned exhibit number inscribed on the frame or receiver. Furthermore, all long guns placed in the reference collection will be tagged in such a manner so as to display their location within the collection.
5. Persons wishing to check a firearm out of the reference collection must fill out the Firearms Reference Collection Release Form.

Note: Information from older submissions can be found in the Reference Collection Log Book, which was discontinued in 2009.

## **AMMUNITION REFERENCE COLLECTION**

### **INTRODUCTION**

The Ammunition Reference Collection is defined as a collection of cartridge components utilized for various scientific reasons, including:

1. To identify the manufacturers' cartridge designation and source of evidence ammunition or component parts thereof.
2. To provide an exemplar resource for the training of laboratory or other departmental personnel.
3. To provide a resource for the identification of ammunition components recovered at a crime scene.

### **PROCEDURE**

The nature of the ammunition reference collection will be dictated or limited by the space and or storage containers available. However, the following should be considered;

1. Use clear plastic (or glass if no plastic tubes in that size exist) tubes or boxes for storage of each ammunition entry.
2. The ammunition sample will be logged into the appropriate database table (Sectioned Cartridges or Sectioned Shotshells) in the Firearms Data database on the department's R: drive recording cartridge data for each field in the table such as:
  - A. Manufacturer
  - B. Bullet weight
  - C. Bullet type or configuration
  - D. The origin (purchased, donated, evidence, etc.)
  - E. For cartridges/shotshells entered after January 1, 2011, the complaint number of the case from which any evidence ammunition will be entered as the origin.
3. Sectioned cartridges will be stored in the appropriate storage cabinet utilizing caliber and exhibit number as appropriate to organize.
4. Sectioned shotshells will be stored in the appropriate plastic bin located inside the live ammunition storage cabinets in the main room of the Firearm Section.
5. Elements of the Ammunition Reference Collection will not normally be transported outside of the section.

## **PHOTOGRAPHY**

### **INTRODUCTION**

Photography may be used to document bullet and/or cartridge case comparisons that result in identifications, document the physical condition of an exhibit (a "Record Shot"), for training purposes, or for scientific publications.

## Firearm Identification Protocol

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Photography may also be used to document a microscopic comparison **for evidentiary or court purposes**. In those cases where photomicrographs are used in court, the examiner should fully explain the limitations (including those listed below) to the jury. Note that if photographs of identifications are not taken, sufficient notes and/or drawings must be made such that another competent examiner can determine what was used as the basis for identification.

### PROCEDURE

1. Situations where photographs are normally used:
  - A. To graphically document the basis of a conclusion; showing some of the characteristics used to make a microscopic identification and/or for an examiner's future recollection of an identification.
  - B. Anytime an item of evidence has to be cut down, cut apart or otherwise dismantled for examination and cannot be reassembled.
  - C. Before and after shots of the obliterated and restored areas related to serial number restorations.
  - D. In the training process.
  - E. To document the physical condition of an item of evidence.
  - F. To include as an illustration in a scientific article or paper.

2. Limitations of Photomicrographs:

Photomicrographs of a comparison seldom completely and accurately depict what is seen through the microscope for many reasons, these include:

- A. An actual comparison is three-dimensional, whereas photographs are two-dimensional.
- B. Photographic film does not have as great a tolerance to light variations as does the human eye.
- C. Digital cameras and their display devices lack the resolution to portray what is seen by the eye.
- D. A photograph limits the field of view.
- E. Many comparisons deal with multiple areas over a large portion of the surface of the evidence and a photomicrograph is unable to pick up these related areas.
- F. Normally available bubble jet, inkjet, laser and color-dye sublimation printers (of 1200 dpi or less) are not capable of providing sufficient resolution to capture the detail necessary to accurately interpret the detail present on bullets or cartridge cases when printing digital images.

3. Photograph Requirements

- A. Photographs will depict the image as the examiner sees it to the degree that is possible with the limitations of the camera, software, and computer hardware available.
- B. All photographs will be stored in PLIMS as an attachment to the assignment. Copies may also be stored on the Department's resource (R:) drive in the examiner's directory.  
(<R:\resources\Department\Crimelab\Sensitive\Case Notes and Photos\Firearms Section>)
- C. Photographs stored on the R: drive will be stored in sub-folders named by the case's F-number.
- D. Photographs will either be named or labeled to describe the item depicted and/or what the photographer intends to illustrate.
- E. Comparison photomicrographs will list the specific items depicted and the magnification or objective used.

### REFERENCES – Firearms Examination

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22. ASCLD/LAB-International, ASCLD/LAB Policy on Measurement Uncertainty, 2011 by ASCLD/LAB.
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## Fired Evidence Examination Methods

The examination of any fired evidence will include the completion of a bullet worksheet, cartridge case worksheet, or a general laboratory worksheet. These worksheets will include the physical description of the fired evidence and will serve as a source to document the condition of the evidence as it is received, and any tests or comparisons performed.

## **Firearm Identification Protocol**

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### **LISTED PROCEDURES**

Physical Examination & Classification of Fired Evidence  
Trace Material Examination  
Caliber Examination  
Land & Groove Measurement – Air Gap Method

GRC Utilization  
Wadding Determination  
Shot Determination  
Microscopic Comparison  
Open File (IBIS/NIBIN)

### **SAFETY CONSIDERATIONS**

These procedures involve hazardous materials, operations and equipment. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised, and the use of personal protective equipment must be considered.

These procedures may also involve hazardous materials to include evidence that may be contaminated with a biohazard. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Proper caution to include strict adherence to Universal Precautions and Blood-borne pathogen safety must be exercised and the use of personal protective equipment must be considered to avoid exposure to any potential hazards.

Appropriate hearing and eye protection must be worn when applicable.

## **PHYSICAL EXAMINATION & CLASSIFICATION OF FIRED EVIDENCE**

### **PROCEDURE**

**BULLET** - A bullet worksheet will be completed. This may include noting the following:

1. The diameter /caliber.
2. The number of land and groove impressions on the fired bullet.
3. The direction of twist.
4. The bullet weight - recording weight of bullets in grains; recording weight of slugs in ounces
5. The number of cannelures.
6. The composition of bullet (finish).
7. The bullet type.
8. How the bullet was marked by the examiner.
9. The measured width of the land impressions.
10. The measured width of the groove impressions.
11. The condition of the fired evidence as received.
12. If any trace material is present.
13. The suitability of the fired evidence for comparison purposes.

**CARTRIDGE CASE** – A cartridge case worksheet will be completed. This may include noting the following:

1. The cartridge case caliber.
2. The headstamp (manufacturer).
3. The case finish.
4. The primer finish.
5. The firing pin impression description (FPI).

## Firearm Identification Protocol

6. The extractor position (EXT).
7. The ejector position (EJ).
8. Any notable breech face marks (BREECH).
9. How the case is marked by the examiner.
10. The condition of the fired evidence as received.
11. If any trace material is present.
12. The suitability of the fired evidence for comparison purposes.

OTHER FIRED EVIDENCE - A general worksheet will be filled out. This may include noting the following:

1. The caliber and/or measured size.
2. The composition.
3. The slug weight (in ounces) or pellet weight (in grains).
4. Possible manufacturer information.
5. Number of pellets, if applicable.
6. The condition of the fired evidence as received.
7. If any trace material is present.
8. The suitability of the fired evidence for comparison purposes.

## TRACE MATERIAL EXAMINATION

### INTRODUCTION

Fired evidence recovered during an investigation may contain trace material transferred from the crime scene. This trace material may be in the form of blood, tissue, plaster, paint, hairs, fibers, glass, etc. The examiner needs to evaluate the importance of this evidence and, if further examination of the trace material is necessary, remove and preserve a sample of the trace material present. Removal of trace material may also be necessary to allow the proper examination of the fired evidence. Removal of the trace evidence may be done by the examiner for later analysis or the item may be sent for analysis by another laboratory.

### PREPARATIONS

**NOTE: ALWAYS ADD ACID TO WATER. NEVER ADD WATER TO ACID.**

15% Acetic Acid Solution:

Prepare a 15% Acetic Acid Solution utilizing Concentrated Glacial Acetic Acid and distilled water.

10% Bleach Solution:

Prepare a 10% Bleach Solution utilizing Bleach and distilled water.

| NFPA LISTING                         |                  |                        |                      |                   |
|--------------------------------------|------------------|------------------------|----------------------|-------------------|
| CHEMICAL                             | HEALTH<br>HAZARD | FLAMMABILITY<br>HAZARD | REACTIVITY<br>HAZARD | CONTACT<br>HAZARD |
| 15% Acetic Acid                      | 2                | 2                      | 3                    |                   |
| 10% Bleach                           | 2                | 0                      | 1                    |                   |
| Methanol                             | 1                | 3                      | 0                    |                   |
| Acetone                              | 1                | 3                      | 0                    |                   |
| MC-404C Enzymatic Detergent Solution | 1                | 0                      | 0                    |                   |

**WARNING!** Acetic acid is capable of detonation and can pose a **SEVERE REACTIVITY HAZARD**.

**WARNING!** Methanol is flammable and can pose a **SEVERE FLAMMABILITY HAZARD**.

**WARNING!** Acetone is flammable and can pose a **SEVERE FLAMMABILITY HAZARD**.

The examiner should use eye protection and work within a fume hood when preparing the solutions. The examiner may wish to consider wearing a respirator and gloves.

### PROCEDURE

1. Examine the fired evidence visually and microscopically for any trace material and record in notes.
2. Determine if further examination of trace material is necessary. If so, remove material being careful not to damage the fired evidence. Place the removed trace material in a suitable container/packaging for submission to the appropriate section/laboratory for further examination. If necessary, consult the appropriate section/laboratory prior to the removal of any trace evidence. If the trace material is not going to be retained for further examination, proceed with the following steps that are applicable.
3. For evidence containing blood, tissue or other biohazards, soak the evidence for at least one (1) minute in a 10% bleach solution or other appropriate solution. The ultrasonic cleaner may also be used; (see instructions below) however the item should be soaked in bleach solution even if the ultrasonic cleaner is used.
4. Remove loose material by rinsing the fired evidence with methanol or water.
5. Remove plaster by soaking the fired evidence in soapy water or a 15% acetic acid solution.
6. Remove paint by soaking the fired evidence in alcohol or acetone.
7. Remove corrosion from copper or brass by soaking in a vinegar and salt based solution, i.e. Texas Pete® hot sauce.

### USE OF THE BRANSON 3510 ULTRASONIC CLEANER

The ultrasonic cleaner should be used per the instruction manual provided with the unit. However, the following items should be noted.

- Be sure to fill the tank with water up to the “Operating Level” line prior to each use
- Place the item to be cleaned in a beaker with enough of the MC-404C enzymatic detergent to cover the item completely
- Turn the timer dial to the desired time
- Heat may also be used, but note that **the heater must be turned off manually** – it does not turn off when the timer stops!
- Never put objects directly on the bottom of the tank
- See cautions in the users’ manual

#### Preparation of the MC-404C Enzymatic Detergent Solution

Add 30ml of concentrated solution to 1 gallon of water. Slightly more of the MC-404C solution may be used if necessary. For the plastic containers currently in use mix 15 ml of the detergent into 1,892.5 ml of water. The solution will appear slightly green.

Dispose of the enzymatic solution down the drain.

## **CALIBER EXAMINATION**

### **INTRODUCTION**

Caliber, or the base diameter, is one of the class characteristics of a fired bullet. The determination of caliber will aid the examiner during the identification or elimination of a suspect firearm. If no firearm is submitted, the bullet's caliber will be used in determining the General Rifling Characteristics of the firearm involved.

### **INSTRUMENTATION**

Comparison Microscope  
Stereo Microscope  
Calipers  
Micrometer

### **PROCEDURE**

The following may be utilized to determine the caliber of any fired bullet. The condition of the bullet will determine which steps can be used.

1. Compare the base diameter of the evidence bullet directly with known fired test standards.
2. Measure the base diameter of the evidence bullet using a measuring device and compare this measurement with known measurements published in reference literature.
3. Determine the number and widths of the land and groove impressions and compare to Table 8 in the Appendix of the AFTE Glossary (6th Edition). The FBI's or J. Scott Doyle's GRC programs also have a utility that may be utilized.
4. Physical characteristics of the evidence bullet, such as weight, bullet shape (morphology), composition, nose configuration, and number and placement of cannelures, may aid in caliber determination.

### **INTERPRETATION OF RESULTS:**

Caliber is written as a numerical term without the decimal point. If the base is mutilated, the examiner may only be able to determine that the evidence is consistent with a range of calibers or that the caliber cannot be determined.

## **LAND & GROOVE MEASUREMENT - AIR GAP METHOD**

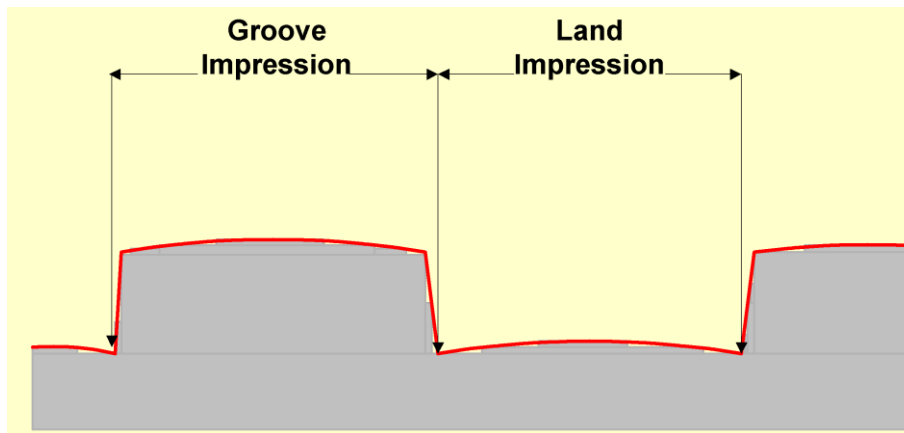
### **INTRODUCTION**

One of the class characteristics used in the discipline of firearm identification is the width of the land impressions and groove impressions. These measurements aid the examiner during the identification or elimination of a suspect firearm. If no firearm is submitted, these measurements will be used in determining the General Rifling Characteristics of the firearm involved. Several instruments and methods can be used to obtain these measurements. The air gap method is one such method.

### **INSTRUMENTATION**

Comparison Microscope  
Micrometer

### PROCEDURE



When measuring a fired bullet to determine the width of the land impression or the groove impression, it is paramount that the points used for beginning and ending a measurement comply with the discipline-wide practice. This practice utilizes the anchor points shown above.

1. The fired bullet in question is mounted on one stage of the comparison microscope. The micrometer is mounted on the other stage.
2. Both stages must be using the same magnification level (objective setting) and be in focus.
3. Align the image of the measurement gap (opening) of the micrometer with the image of the appropriate land impression being measured and record the measurement to the nearest hundredth or thousandth of an inch.
4. Repeat the above utilizing the groove impression.

### INTERPRETATION OF RESULTS:

It may be necessary to measure several of each land and groove impression in order to record a reliable measurement.

## GENERAL RIFLING CHARACTERISTICS - GRC

### INTRODUCTION

The GRC Search application located in the Database section of the Members Area on the AFTE website can be utilized when attempting to determine a list of possible firearms that could have fired an evidence bullet. The data used in this database was originally compiled from the 2016 FBI Laboratory General Rifling Characteristic database. As of March 2017, this database is maintained and updated by the AFTE Electronic Resources Committee.

### PROCEDURE

1. The GRC Search application on the AFTE website can only be accessed by a registered member of AFTE.

2. Detailed instructions can be found on the GRC Search page by clicking the AFTE Electronic Resources Database Search and Entry Procedures link.

### INTERPRETATION OF RESULTS:

The GRC File is an investigative aid and should not be construed as an all-inclusive list of firearms available with those particular rifling characteristics.

## WADDING DETERMINATION

### INTRODUCTION

By examining wadding, the examiner may be able to determine the gauge, manufacturer, and if the wad contains markings suitable for comparison, from the firearm that discharged it.

### PROCEDURE

1. Trace material present should be recorded and retained, if necessary.
2. If contaminated with blood or tissue, the wad should be disinfected.
3. Determine gauge size by directly comparing evidence to known laboratory standards of similar manufacture or composition by comparing the base of evidence to the bases of the standards until a similar size is found. Gauge size can also be determined by measuring the base diameter of the wad and comparing these measurements to known measurements. Measurements may be obtained by utilizing calipers, the air gap procedure, or a hand held ruler.
4. Manufacturer data can be determined by locating information stamped into the wad or by comparing the wad to known laboratory standards.
5. Microscopic examination may reveal striations suitable for identification of the wad back to the shotgun that fired it.
6. If evidence shotshells are submitted, it may be necessary to disassemble one for the determination of gauge or manufacturer.
7. Record all information on the appropriate worksheet.

### INTERPRETATION OF RESULTS:

If the wad is mutilated or soaked with blood or other body fluids, the examiner may not be able to specifically determine gauge size. The examiner should also recognize that some manufacturers duplicate the design of another manufacturer or use the parts from another manufacturer in their products.

## SHOT DETERMINATION

### INTRODUCTION

By examining recovered shot pellets, the examiner may be able to determine the actual shot size. The determined size can then be compared to the shot size loaded in submitted live shotshells or to the size that the submitted discharged shotshell was marked to have contained.

### INSTRUMENTATION

## Firearm Identification Protocol

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Stereo Microscope  
Calipers / Micrometer  
Scale / Balance

### PROCEDURE

The examiner may use one or more of the techniques below to determine shot size.

#### I. Visual/Microscopic Comparison

- A. Determine the total number of pellets received.
- B. Determine the composition of the pellets.
- C. Determine the number of pellets suitable for comparison purposes. Make note if pellets all appear to be similar in size. If several different sizes are present, determine each specific size.
- D. Compare the evidence pellets side by side with laboratory standards of known shot sizes until a shot size is determined. A stereo microscope may aid in this determination.
- E. Record findings on appropriate worksheet.

#### II. Comparison by Weight

- A. Record the total number of pellets received.
- B. Determine the composition of the pellets.
- C. Determine the number of pellets suitable for weighing. Make note if pellet sizes all appear similar. If several sizes are present, determine each specific size separately.
- D. Weigh the pellets in grams or grains.
- E. Divide weight of pellets by total number weighed. Consult known pellet weights in Table 1 of the Appendix in the AFTE Glossary (6th Edition) and determine shot size which corresponds to evidence shot.
- F. Record findings on appropriate worksheet.
- G. The weight of the evidence pellets can also be directly compared to weight of standards using the same number of pellets.

#### III. Measuring Pellet Size

- A. Determine the total number of pellets received.
- B. Determine the composition of the pellets.
- C. Determine the number of pellets suitable for comparison purposes. Make note if pellets all appear to be similar in size. If several different sizes are present, determine each specific size separately.
- D. Choose the best specimen(s) and measure diameter using calipers and record in hundredths or thousandths of an inch.
- E. Consult known pellet sizes in Table 1 of the Appendix of the AFTE Glossary (6th Edition) and determine shot size which corresponds to evidence shot.

## **MICROSCOPIC COMPARISON**

### **INTRODUCTION**

In order for a firearm examiner to identify fired evidence back to the firearm that fired it, a microscopic comparison utilizing a comparison microscope must be performed. The comparison microscope allows the examiner to place the evidence on one stage of the microscope and a known test standard on the other stage. This procedure can also be utilized in cases where no gun is recovered such as determining whether fired bullets or discharged cartridge cases were fired from/discharged in the same firearm.

### **INSTRUMENTATION**

Comparison Microscope

### **PROCEDURE**

The procedure steps below do not have to be performed in the order listed; however, all steps must be considered and/or addressed.

- I. Select the correct objective (magnification) setting and ensure that the objectives are locked in place.
- II. Select an appropriate type of illumination.
- III. The illumination used must be properly adjusted.
- IV. Intercompare test fired components first to establish reproducibility of class and individual characteristics.
- V. Compare unknown piece of fired evidence to either another unknown piece of fired evidence or known test shots by placing the unknown evidence on one stage and the other unknown evidence or known standard on the other stage.
- VI. The entire evidence surface should be considered.
- VII. If an identification is not initially made, the examiner should consider the following factors:
  - A. Lighting angle.
  - B. Type of light being used.
  - C. The need for additional known standards (possibly using different ammunition for test shots).
  - D. The position of the evidence, the tests or both the evidence and the tests.
  - E. The possibility of using magnesium smoke.
  - F. The possibility of cleaning the firearm and firing additional tests.

### **INTERPRETATION OF RESULTS**

#### **IDENTIFICATION**

When compared items exhibit agreement of all discernable class characteristics and sufficient agreement of a combination of individual characteristics where the extent of agreement exceeds that which can occur in the comparison of toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool, the examiner will report an identification or that both items originated from the same source. The report will qualify the significance of the association with a qualitative statement. Sufficient notes or photomicrographs are required to document conclusions of a positive identification. A photomicrograph showing the correspondence of individual characteristics between exhibits will suffice to meet this requirement.

### INCONCLUSIVE

When the examiner concludes that no identification or elimination is possible because the compared items exhibit (1) some agreement of individual characteristics and all discernable class characteristics, but insufficient for an identification; or (2) agreement of all discernable class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility; or (3) agreement of all discernable class characteristics and disagreement of individual characteristics, but insufficient for an elimination. Within the category of no identification/no elimination there may be degrees of certainty expressed. No professional standard exists which limits an expression of likelihood. Where no definitive conclusion can be reached, the report will clearly communicate the reason(s); e.g. insufficient agreement of individual characteristics, damage, etc. Photographs will not be required in the case of inconclusive findings, rather notes will be sufficient to fully support the conclusion.

### ELIMINATION

When compared items exhibit disagreement of discernable class characteristics or significant disagreement of individual characteristics the examiner will report an elimination or that the items did not originate from the same source. The report will qualify the significance of the elimination with a qualitative statement. Photographs will not be required in the case of an elimination, rather notes will be sufficient to fully support the conclusion; however, it is strongly suggested that photographs be taken where eliminations are based on the disagreement of individual characteristics.

### UNSUITABLE

A lack of suitable microscopic characteristics will lead the examiner to the conclusion that the items are not suitable for comparison. When evidence bears no marks suitable for microscopic comparison, the documentation of the determination will be recorded on worksheet.

### VERIFICATION

It is the policy of this laboratory that (unless one is unavailable for an extended period) another qualified examiner will verify microscopic comparisons that result in a conclusion of a positive identification. This verification will be documented in the examiner's notes (verifying examiner's initials and date). Where multiple exhibits are all identified, a representative sample will be verified. It is not necessary to verify each exhibit.

It is suggested that any identification be indexed.

## **INSTRUMENTS USED IN ANALYSIS**

Examinations performed by each examiner will be done with the equipment listed in Appendix B unless listed otherwise in the case notes.

## **Open Case File (IBIS/NIBIN) Integrated Ballistics Identification System (IBIS) National Integrated Ballistic Information Network (NIBIN)**

### **INTRODUCTION**

The open case file (IBIS/NIBIN) is a collection of digital images of discharged cartridge cases from unsolved crimes where a firearm has not been located or connected to the evidence collected at the crime scene.

Discharged cartridge cases received where no firearm is submitted for comparison will be included via a representative sample in the open case file when all other necessary examinations are completed and as long as there are marks deemed to be suitable by the examiner on the cartridge cases. (The current parameters are listed earlier in the SOP under Test Firing Methods). These cartridge cases are entered into IBIS and correlated against test fired cartridge cases, as well as evidence cartridge cases from previous and subsequent incidents.

IBIS is a computerized system for acquiring and storing the images of questioned (evidence) cartridge cases and known cartridge cases (test fired in known firearms). IBIS photographs areas of the case head of discharged cartridge cases. These images are stored in the database and sophisticated algorithms are used to correlate the images against each other using filters such as the caliber, date of crime, and date of entry. These correlations produce lists of possible matches with the highest scoring correlations at the top of the list. The IBIS technician can then view the images side by side on a monitor. If a possible association (IBIS/NIBIN lead) is found during this process a lead notification will be sent to the officers assigned to each case and those in the NIBIN\_Leads distribution list. If requested, a firearm examiner can make a microscopic comparison of the exhibits to confirm the lead.

NIBIN is the national database of digital images of fired cartridge cases, which is managed by the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF).

### SCREENING FIRED EVIDENCE FOR IBIS

Discharged cartridge cases of applicable calibers may be screened by the IBIS technician or a firearm examiner for IBIS entry without a service request from an officer or detective. The cartridge cases in these types of cases will be screened for IBIS inclusion in lieu of a full examination and microscopic comparison. Since a service request will not be submitted, a PLIMS assignment will not be generated; therefore, with these types of cases the screener will not be required to complete a case folder, notes, or report regarding the screening. A Case file (IBIS/NIBIN) Screening Notification form will be completed and attached to the appropriate complaint number under the CASE INFO tab in PLIMS once the screening has been completed and cartridge case(s) have been selected for entry.

Leads resulting from this screening process will either require the examiner to issue an UNCONFIRMED IBIS/NIBIN Lead Notification or complete a full examination and microscopic comparison of the previously screened evidence. If more than one caliber is represented among the previously screened evidence, or if there are class characteristic differences among cartridge cases of the same caliber, the examiner will only be required to do a full examination and microscopic comparison (if applicable) of the cartridge cases related to the IBIS lead. The examiner also has the discretion to complete a full examination of the evidence at the time of the screening process.

## IBIS RESPONSIBILITIES

### THE IBIS TECHNICIAN

1. The IBIS technician will scan each item into their custody in PLIMS.
2. The IBIS technician has the responsibility of acquiring cartridge cases into IBIS and reviewing the correlation results. Once completed, evidence cartridge cases will be returned to the Property and Evidence Management Division and tests will be scanned to and filed in the FA Fired Standards cabinets., storing or returning to Property Control, and correlating all IBIS entries.
3. The IBIS technician is also responsible for entering information into the IBIS Data Entry Logbook.
4. The IBIS technician will be responsible for reviewing the correlations of all test fired and evidence cartridge cases entered into IBIS, following the method listed in the Procedures section below.
5. The technician will notify a firearm examiner if a possible lead is found.
6. The IBIS technician will be the primary liaison to Forensic Technology (FTI) and will be responsible for contacting FTI for any maintenance issues with the unit.
7. The IBIS technician will be responsible for entering the required information regarding the IBIS entry into the CMPD Firearm Tracking Database.

## Firearm Identification Protocol

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8. The IBIS technician will be responsible for completing a Open Case File (IBIS/NIBIN) Entry Notification Form and attaching same under the CASE INFO tab in PLIMS for the applicable complaint number.

### FIREARM EXAMINERS

Firearm Examiners have the following responsibilities with respect to IBIS:

1. Know which calibers are acceptable for IBIS entry. The current list of calibers is found in the "*Open File (IBIS/NIBIN) Parameters*" section of this SOP.
2. Know the preferred ammunition for test firing known firearms for entry of test cartridge cases into IBIS.
  - Federal American Eagle (preferred)
  - Other manufacturers (especially those with softer primers) are acceptable if Federal American Eagle is not available.
3. The examiner will determine if evidence cartridge cases are suitable for entry into IBIS.
  - Any evidence cartridge case selected for entry into IBIS should have sufficient individual characteristics within the firing pin impression and/or the breech face marks on which to base a positive identification.
  - The examiner should select the best cartridge case for entry or, if necessary, more than one if different individual characteristics reproduce better on different specimens.
4. The Firearm Section supervisor or his designee will be responsible for following up on possible cross jurisdictional IBIS leads.
5. Test Samples:
  - See the section Open File (IBIS/NIBIN) Parameters and Retention of Fired Tests in the Test Firing Methods portion of this SOP for determining which tests are to be entered into IBIS and for the storage of the tests.
6. Evidence Cartridge Cases:
  - The firearm examiner will seal the cartridge case(s) in their original packaging when all other examinations are complete. The item number of evidence cartridge case(s) to be entered should be noted on the examiner's worksheet(s).
  - The firearm examiner will note the item numbers that are to be entered in IBIS on the evidence packaging (near their initials).
  - The firearm examiner will transfer the evidence to the IBIS IN box by scanning the location and evidence barcodes in PLIMS.
7. IBIS/NIBIN Leads
  - The IBIS technician (or other individual reviewing correlation results) will inform a firearm examiner of the possible lead.
  - The firearm examiner will evaluate the IBIS printout provided, or if necessary, the screen images to determine if a confirmation between the two exhibits would be warranted.
  - If so, the firearm examiner (or their designee) will add a new IBIS Unconfirmed Lead in the CMPD Scout application, which will result in email notifications to various CMPD personnel, including the officers assigned to each case. The examiner will scan the IBIS printouts used for the notification of the lead and attach them under the CASE INFO tab in PLIMS for each newly linked complaint number. The IBIS printout will be marked as "Restricted."

## **Firearm Identification Protocol**

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- A copy of the IBIS/NIBIN Lead Notification email will also be attached similarly as noted above; however, the email will not be restricted.
- Unless a new service request is received through PLIMS for microscopic confirmation of the IBIS/NIBIN lead, no further is required.
- The firearm examiner has the discretion to confirm any IBIS/NIBIN lead, without a service request, via microscopic comparison and would generally do so when a homicide is involved.

### **8. IBIS/NIBIN Leads to be confirmed via microscopic comparison**

- Generally, lead confirmations will require a PLIMS service request to be submitted under at least one of the cases. If an examiner is confirming the lead at their discretion, the IBIS printouts will serve as the lab request.
- A new assignment will be opened in PLIMS for each case.
- The examiner that worked the original (fired evidence) case will generally work the IBIS/NIBIN lead confirmation in cases where the firearm technician has submitted a test.
- The firearm will be retrieved and worked as a new case.
- The appropriate version of the Firearm Worksheet should be chosen considering both types of cases involved in the lead.
- In the case of two (or more) fired evidence cases, the examiner who worked the most recent case will generally work the IBIS/NIBIN lead; however, another examiner may work the lead at the discretion of the section supervisor.
- The IBIS/NIBIN lead will be reported out under the complaint numbers of all cases involving a microscopic comparison.
- Appropriate notes will be scanned and attached to the assignments for all confirmed cases in PLIMS and placed in the hard copy case files.

## **ACQUIRING CARTRIDGE CASES**

The procedure for acquiring cartridge cases can be found in the IBIS BRASSTRAX Training Guide.

## **CARTRIDGE CASE CORRELATIONS**

The procedure for correlating cartridge cases can be found in the IBIS MatchPoint+ Training Guide.

## **IMAGE COMPARISONS**

The procedure for comparing cartridge case images can be found in the IBIS MatchPoint+ Training Guide.

## **REVIEWING CORRELATION RESULTS**

1. The IBIS technician will do an onscreen correlation review of each of the evidence and test fired cartridge cases entered into IBIS. These reviews will be documented via IBIS' internal software feature and in the IBIS Data Entry Logbook.
2. In the BRASSTRAX database the IBIS technician will enter the evidence cartridge case correlated against the database into the computer as the reference cartridge case.
3. The IBIS technician will review the top twenty (20) candidate list on the correlation screen and then review any additional Charlotte cases under the unified scores that were not reviewed previously.
4. If a possible lead is found, the IBIS technician will inform the appropriate firearm examiner.

## **BACKING UP THE SYSTEM**

The CMPD Crime Laboratory has no responsibility regarding the back up of information in the IBIS/NIBIN database.

## IBIS QUALITY CONTROL AND PROFICIENCY TEST

The purpose of acquiring a Quality Control (QC) Cartridge Case, minimally on a quarterly basis (calendar year), is to address two issues: (1) to ensure that the IBIS hardware and software are calibrated and performing properly, and (2) to assure that the IBIS technician is acquiring data according to established training and protocols. The source of the Cartridge Case will be from a firearm from the NC State Crime Laboratory Firearm Section. The QC Cartridge Case should be carefully marked and packaged.

This cartridge case should be entered into the IBIS on a quarterly basis, the correlation results of which will be recorded in the IBIS unit. The QC cartridge case should hit to previously entered tests of that same firearm, which were entered at other IBIS locations within the state. Any apparent gross deviation from the previous scores will be discussed with Section Administrator of the Firearm Section. Possible solutions to the deviation will be agreed upon prior to any further data acquisition. The correlation score sheet(s) will be maintained with the IBIS Quality Control Logbook.

**At least one time per year** a proficiency test will be administered to each individual who will be making entries into the IBIS. The proficiency test will consist of a mock case utilizing a discharged cartridge case fired in one of the firearms from the section's Firearm Reference Collection. For purposes of proficiency testing the Section Administrator (or his designee) will do the following:

- a. Review the entry of the chosen test cartridge case. Ensure that the proper laboratory and IBIS procedures are followed.
- b. Evaluate the image quality and correlation results of the item entered.
- c. Review documentation and results with the IBIS technician. The guidelines of the CMPD Crime Laboratory Quality Manual will be followed with respect to any unsatisfactory findings.
- d. Results of the proficiency test will be documented using the Proficiency Test Review Form and retained in the proficiency test file cabinet. The results will be forwarded to the Laboratory Director and the Quality Assurance Manager.

## REFERENCES – Fired Evidence

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21. AFTE Forum, One Hot Brass Cleaner!, posted by Scott Doyle, August 25, 2008 (<http://www.afte.org/forum/smf1/index.php?topic=4658.0>)
22. [www.afte.org](http://www.afte.org)
23. [www.firearmsid.com](http://www.firearmsid.com)

## Possible Results – Firearm Examination

There are a number of possible results relating to the examination of firearms and fired evidence. This section is included as a guide for the most frequently reported results. It should not be construed to be all-inclusive or limiting to the examiner in reporting examination results. The Official Report will accurately, clearly, and objectively state the results for all items tested.. Additionally, the method(s) used to analyze the evidence will be identified or described in the laboratory report.

## FIREARM OPERABILITY

- The firearm is in XXX operating condition.
  - Good** - Functions as designed by the manufacturer.
  - Fair** - Functions every time the trigger is pulled, but not to design standards. (e.g., safeties may not function).
  - Poor** - Will fire, but not reliably.
  - Very Poor** - Will fire intermittently, but very unreliably.
  - Inoperable** - Will not fire.

## Firearm Identification Protocol

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- Examination revealed that the firearm was not safe to test fire.
- The firearm was found to be missing (several) parts and is, therefore, inoperable.
- The force required to activate the trigger of XXX was found to be within/above/below the normal range for this type of firearm.
- The firearm was found to exhibit a barrel length of XXX inches +/- 3/16 inch at K=2 (95.45%).
- The firearm was found to exhibit an overall length of XXX inches +/- 5/32 inch at K=2 (95.45%).
- ### of the live cartridges submitted with the firearm were used for test firing and comparison purposes.

## FIRED EVIDENCE

### BULLETS

- The bullet is a XXX caliber bullet exhibiting XXX land and groove impressions with a XXX twist.
- The bullet is a XXX caliber bullet that was fired from a firearm exhibiting XXX lands and grooves with a XXX twist.

#### **With Gun-**

- The bullet was fired from the firearm based on sufficient agreement of individual characteristics.
- The bullet was not fired from the firearm based on different class characteristics (or significant differences in individual characteristics).
- The bullet exhibited similar class characteristics and some similar individual characteristics as tests fired from the firearm; however, a positive identification was not made due to insufficient agreement of individual characteristics.
- The bullet could neither be identified nor eliminated as having been fired from the firearm.\*
- The bullet exhibited similar class characteristics and some dissimilar individual characteristics as tests fired from the firearm; however, an elimination was not made due to insufficient disagreement of individual characteristics.
- The bullet is not suitable for comparison.

#### **No Gun-**

- The bullets were fired from the same firearm based on sufficient agreement of individual characteristics.
- The bullets were not fired from the same firearm based on different class characteristics (or significant differences in individual characteristics).
- The bullets exhibited similar class characteristics and some similar individual characteristics; however, a positive identification was not made due to insufficient agreement of individual characteristics.
- The bullets could neither be identified nor eliminated as having been fired from the same firearm.\*
- The bullets exhibited similar class characteristics and some dissimilar individual characteristics; however, an elimination was not made due to insufficient disagreement of individual characteristics.
- At least one of the bullets is not suitable for comparison.
- A list of possible firearms that could have fired the bullet includes, but is not necessarily limited to the following: XXX, XXX, XXX, ...
- A list of possible firearms that could have fired Item # XXX includes, but is not necessarily limited to those manufactured/marketed by: XXX, XXX, XXX, ...
- A list of possible firearms that could have fired the bullet is too long to be included in the lab report.
- The bullet exhibits characteristics associated with having been fired from a firearm manufactured by XXX.

\* Note: Within the category of no identification/ no elimination there may be degrees of certainty expressed. No professional standard exists which limits an expression of likelihood. Where no definitive conclusion can be reached, the report will clearly communicate the reason(s); e.g. insufficient agreement of individual characteristics, damage, etc.

### CARTRIDGE CASES

#### **With Gun-**

- The cartridge case was fired in the firearm based on sufficient agreement of individual characteristics.

## Firearm Identification Protocol

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- The cartridge case was not fired in the firearm based on different class characteristics (or significant differences in individual characteristics).
- The cartridge case exhibited similar class characteristics and some similar individual characteristics as tests fired in the firearm; however, a positive identification was not made due to insufficient agreement of individual characteristics.
- The cartridge case could neither be identified nor eliminated as having been fired in the firearm.\*
- The cartridge case exhibited similar class characteristics and some dissimilar individual characteristics as tests fired in the firearm; however, an elimination was not made due to insufficient disagreement of individual characteristics.
- The cartridge case was not suitable for comparison.

### **No Gun-**

- The cartridge cases were fired in the same firearm based on sufficient agreement of individual characteristics.
- The cartridge cases were not fired in the same firearm based on different class characteristics (or significant differences in individual characteristics).
- The cartridge cases exhibited similar class characteristics and some similar individual characteristics; however, a positive identification was not made due to insufficient agreement of individual characteristics.
- The cartridge case could neither be identified nor eliminated as having been fired in the firearm.\*
- The cartridge cases exhibited similar class characteristics and some dissimilar individual characteristics; however, an elimination was not made due to insufficient disagreement of individual characteristics.
- At least one of the cartridge cases is not suitable for comparison.
- The cartridge case exhibits characteristics associated with having been discharged in a firearm manufactured by XXX.

\* Note: Within the category of no identification/ no elimination there may be degrees of certainty expressed. No professional standard exists which limits an expression of likelihood. Where no definitive conclusion can be reached, the report will clearly communicate the reason(s); e.g. insufficient agreement of individual characteristics, damage, etc.

## **SHOT & WADDING**

- The wadding is a (or exhibits the characteristics of a) XXX gauge XXX (material) wad.
- The wadding exhibits the characteristics of those manufactured by XXX.
- The wadding exhibits the characteristics of those loaded in the shotshells submitted.
- The pellets are consistent in size and weight with XXX (size) XXX (metal) pellets.
- The pellets exhibit the characteristics of those loaded in the shotshells submitted.

## **IBIS**

- The cartridge case will be compared to the open file (IBIS/NIBIN).
- The cartridge case is not suitable/applicable for open case file (IBIS/NIBIN) inclusion.

## **Release of Case Related Information**

Examiners will generate written reports for all analytical work performed on evidence. The reports will contain the conclusions and opinions that address the purpose for which the analytical work was undertaken. At times due to the immediacy of an ongoing investigation it may be necessary to release information prior to writing a report. It is required that an appropriate review (e.g., comparison verification, etc.) take place before any such information is released. The release of information will be noted in the case file.

For purposes of the Firearm Section, comparison information will not be released until a verification has taken place and documented in the case notes (unless the absence of a second analyst makes this impossible). Information i.e., firearm operability, barrel or overall length, GRC lists, etc. may be released before a case file is reviewed, however it should be made clear to the person receiving the list that the information is preliminary and subject to change upon case review/ID verification.

## Firearm Identification Protocol

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| Issue Date | History                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 03/31/00   | Original Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11/1/00    | Changed open file/IBIS procedures with addition of IBIS & IBIS technician to section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3/19/01    | Added IBIS procedures section, changed photography section, edited and added references, added 223 Rem cartridge cases to IBIS parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 9/10/01    | Allowed IBIS technician to work drug cases and write limited reports.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1/31/02    | Clarified evidence vs. standard reference collection and what could be used for comparison purposes. Defined "normal" as used on trigger pull on worksheet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1/30/04    | Eliminated use of the "routine case memo", upgraded Gene's title, added unloading procedure, added white slider box illustrations, fixed typos, updated process map.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1/11/07    | Clarified pre-firing safety examination requirements. Required the use of a NIST traceable yard stick for barrel and overall length measurements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3/28/08    | Added section regarding efficient use of resources, modified the silencer examination SOP, modified the IBIS responsibilities of the section supervisor, added the release of case related information, updated serial number restoration map, fixed typo on FA analysis process map, updated abbreviations page.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5/7/09     | Added Swabbing Firearms for DNA, changed IBIS applicable calibers, modified policy regarding test firing certain types of pistols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 9/13/10    | Added reporting requirement for DNA swabbing, revised barrel and overall length measuring SOPs, changed reporting terminology for trigger pull testing, added information regarding the ultrasonic cleaner, updated abbreviations page.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3/8/11     | Updated measuring of BBL and OAL, Reference Collections, Photography, Interpretation of Comparison Results and Reporting of Inconclusive Results to meet ISO 17025 requirements. Added a note on instrumentation used by examiners and added Appendix D.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 6/17/11    | Updated footer for ISO 17025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 9/8/11     | Revised estimated uncertainty values and updated related reporting policy to follow ASCLD/LAB-International requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2/7/12     | Updated IBIS section for training manual versions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12/5/12    | Revised reporting statements for barrel and overall lengths and fired evidence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5/15/13    | Updated for new BRASSTRAX IBIS unit (no more bullets)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12/11/13   | Updated measurement uncertainty and its reporting due to new personnel and updated ASCLD-LAB guidance documents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12/26/13   | Updated IBIS caliber and process guidelines.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4/4/14     | Made extensive revisions for use with new PLIMS and new CMPD firearms process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 12/18/14   | Updated IBIS process items and minor edits/updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 9/22/16    | Added option of using GRC Search application on AFTE website (pg. 28).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 10/6/16    | Added process for screening DCCs for IBIS entry (pg. 32).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6/12/17    | Corrected numerous typographical and grammatical errors and made minor wording changes throughout. Removed specificity regarding marking of CMPD issued pistols (pg. 2). Modified parameters of firearms entered into the tracking database (pg. 4). Removed Chatillion trigger pull tester as a method since it was taken out of service and is no longer used (pgs. 6 and 7). Revised orientation of muzzle when testing trigger pull via hanging weights (pg. 7). Replaced or removed "NIST traceable yard stick" under barrel and OAL length measurement section (pgs. 8 and 9). Changed UoM for barrel length (pg. 9). Removed statement regarding silencer legality (pg. 15). Removed suggesting for using Cunningham Drop tester (pg. 16). Minor rewording of identification conclusion to mirror AFTE's Range of Conclusions (pg. 30). Specified a representative sample of DCCs will be submitted for IBIS in no gun cases (pg. 31). Modified reexamination procedure for IBIS hits resulting from screening (pg. 31). Removed IBIS technician's responsibility for backing up IBIS data (pg. 33). Removed requirement to periodically chart IBIS QC results (pg. 35). Changed UoM for barrel length under Possible Results (pg. 36). Updated Appendix C to reflect new data of recent UoM study. |

## **Firearm Identification Protocol**

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9/19/19  | Removed procedures for Swabbing Firearms for DNA (pg. 3); combined Water Recovery Tank and Bullet Trap procedures (pg. 9); moved the diagram for land and groove impression measurements (pg. 24); combined, rewrote, and reorganized sections related to the open case file (IBIS/NIBIN) (pg. 29); added section to allow for issuance of Unconfirmed Lead Notification (pg. 31); removed citations to ASCLD -LAB; numerous minor verbiage and grammatical changes.                                                                                                                                                                     |
| 4/6/20   | Updated IBIS lead notification procedures (pg. 30).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6/22/20  | Updated Appendix C to reflect new data of recent UoM study. Updated measurement uncertainty values for barrel and overall length (pgs. 8 and 33).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 10/20/20 | Revised procedure for screening fired evidence for IBIS entry (pg. 28).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 04/12/21 | Removed trigger pull from information included on long worksheet (pg. 2); reworded and condensed procedure regarding firearm tracking database (pg. 3); reworded procedure under open file parameters (pg. 9); added statements addressing qualifying the significance of associations with regard to identifications and eliminations (pgs. 27 and 28); changed the word "hit" to "lead" relating to IBIS/NIBIN (pgs. 29-31); added examples of possible results for identifications, eliminations, similar/similar, and similar/dissimilar conclusions (pgs. 34 and 35); multiple minor verbiage and organizational changes throughout |
| 10/19/22 | Updated IBIS Responsibilities section (pgs. 29 and 30) to reflect current procedures for disseminating IBIS/NIBIN leads and confirmation of same.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 08/21/24 | Minor wording changes throughout document; removed stereoscope with measuring reticle as a method to measure LWD/GWD (pg. 19); updated section on GRC and removed outdated search methods (pg. 24); updated Open Case File (IBIS/NIBIN) section (pgs. 28-31); and updated measurement uncertainty values for barrel and overall length (pgs. 7 and 33)                                                                                                                                                                                                                                                                                   |

### **Approval**

Director



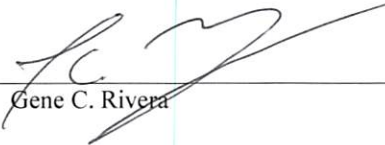
Matthew C. Mathis

Date:

8/21/2024

### **Issuance**

Chief Criminalist



Gene C. Rivera

Date:

8/21/24