Department of Forensic Science

FIREARM/TOOLMARK

FORENSIC LABORATORY SPECIALIST TRAINING MANUAL

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1 INTRODUCTION AND ORIENTATION

1.1 Purpose and Scope

1.1.1 The purpose of this manual is to provide a uniform coordination of the training of a Forensic Laboratory Specialist (FLS) in the Firearms and Toolmarks Section of the Commonwealth of Virginia Department of Forensic Science. This work is intended to be used in a formal training program that will establish a certain minimum standard of professional competency throughout the statewide branches of the Department of Forensic Science.

1.1.2 Certain inherent qualities of firearm and toolmark evidence prohibit the establishment of a rigid set of standard procedures to cover every case. Therefore, enough latitude has been given to allow for independent thought and individual freedom in selecting alternative courses of action. Upon completion of this program the employee will be thoroughly familiar with the options available to handle most pieces of evidence that will be encountered.

1.1.3 The sequence in which the tasks are presented in the outline should not necessarily be considered as a mandatory order of instruction. Exposure to legal aspects and testimony will be continuous throughout the training.

1.1.4 Successful completion of Modules 1, 2, and 3 is required to function independently as an FLS II. The remaining modules shall be completed to function independently as an FLS III.

1.2 Coordination of the Program

1.2.1 The training program will be coordinated by the Training Coordinator (TC). The TC is designated by the Section Supervisor in consultation with the Program Manager (PM).

1.2.2 The TC will be responsible for the overall training but may delegate certain blocks of instruction to other qualified section members.

1.3 Training Period

A full-time employee should complete the required modules for an FLS II in approximately 2-3 months and 4 -5 months for a part-time employee. Completion of modules 4, 5, 6 and 7 should take approximately 4-5 months for a full-time employee and 8-10 months for a part-time employee.

1.4 Location of Training

Whenever practical, the bulk of an individual's training will occur in the lab to which they will be assigned**.**

1.5 Training Goals

The FLS II training shall culminate so that the FLS has the following:

- The ability to properly handle forensic evidence.
- The ability to independently perform safety checks on submitted firearms.
- Perform QA/QC procedures.

The FLS III training shall culminate so that the FLS has the following:

- The ability to independently prepare casework for examiner review.
- The ability to independently evaluate for safety and function and test fire all firearms evidence.
- The ability to independently perform NIBIN system entries.

- The knowledge to serve as a contact person for the Firearms and Toolmarks section with other laboratory sections and outside agencies.
- The ability to provide fact-based testimony in court.

1.6 Instructions to the FLS

1.6.1 The FLS is expected to keep a notebook of information compiled for each Module of this manual. This notebook will be evaluated by the TC throughout the course of the training and by the PM and Quality Assurance Coordinator upon completion of the training.

1.6.2 The written answers to the study questions listed in each section will be used as reference material once qualified as an FLS. Therefore, references are to be listed for each answer whenever possible. The completed study questions are to be turned into the TC as scheduled. A list of useful references has been provided in the Reference section of each module.

1.6.3 References listed as "Required Reading" are required for an adequate understanding of the subject matter. Required readings are designated by section numbers listed after the assignment.

1.6.4 The FLS's progress will be evaluated with written examinations, practical exercises, practical examinations, oral sessions, mock trials and competency examinations. Passing for a written examination is at least 85% correct responses. Passing for a practical examination is arriving at the expected result.

1.6.5 Oral sessions are question and answer sessions that will be conducted throughout the training period. They will be cumulative. There will be two different types of expected responses. First, there will be technical responses. Second, there will also be times when the FLS will need to respond as if speaking to a jury. It will be made clear which type of response is expected. The Oral Session Rubric shows the FLS what will be expected of them in these oral sessions. This rubric will be used to evaluate the FLS during the oral sessions.

1.6.6 The FLS should provide a written progress report to the TC every two weeks.

1.7 Instructions to the Training Coordinator

1.7.1 All of the listed topics must be incorporated into the program. Some of the topics will strongly suggest an order of events and this ranking should be followed. Any significant deviation from the manual must be approved by the PM.

1.7.2 The performance of the FLS will be evaluated during the course of the program. The TC must submit, every two weeks, written evaluations to the PM and Laboratory Director (via Qualtrax). The TC is to discuss this evaluation with the FLS prior to forwarding it to the PM. Any relevant comments by either the FLS or TC are to be included with the evaluation. A copy of the evaluation will be placed in the training file.

1.7.3 The TC is responsible for maintaining the Department's training program documentation during the training period. Each module in the Firearms/Toolmark FLS Training Record must be initialed and dated upon completion of the specified task. If any task is not completed, for any reason, this must be explained in the training file and approved by the PM.

1.7.4 The TC will submit a written recommendation to the PM outlining the modules which may be omitted or modified and the justification for doing so. A copy of the approved recommendation will be placed in the training file.

1.7.5 Written and/or oral examination questions for each module will be selected or derived from the study questions and required readings by the TC.

1.7.6 The written and/or oral examination will be given in a "closed book" format.

1.8 Completion of Training

1.8.1 FLS II Upon satisfactory completion of modules 1, 2 and 3, the TC will forward a copy of the signed training record to the Section Supervisor and PM for final qualification. The documents will then be forwarded to the appropriate Lab Director.

1.8.2 FLS III Upon satisfactory completion of modules 4, 5, 6 and 7, the FLS will complete a practical test, and mock trial. The practical test is a mock case, intended to simulate an average case in difficulty and complexity. The test shall be approved by the PM prior to being presented to the FLS. The mock trial will be fact-based testimony related to the practical test. The roles and responsibilities outlined in the QM for Forensic Scientist will be utilized for the FLS mock trial.

1.8.3 Training Documentation

The following shall be maintained and serve as the technical training file:

- written tests
- description of practical exercises, with results as applicable
- competency practical test
- signed and dated Firearms/Toolmark FLS Training Record
- training evaluations

At the completion of the training the technical training file should be retained by the supervisor and be accessible for internal and external quality audits.

1.9 Orientation

1.9.1 Before beginning the training program, an orientation of the new employee will include an introduction to the operating facilities and personnel.

1.9.2 The following documents will be covered:

- QM
- Regional Operating Procedures
- Safety Manual
- Firearm/Toolmark Procedures Manual
- Firearm/Toolmark FLS Training Manual

1.9.3 The outline of the training program and the expectations of both the TC and the FLS will be discussed.

1.9.4 The duties of a FLS, as determined by the classification of the position, will be clarified.

1.9.5 An introduction to the LIMS system will be given.

1.10 Firearms Safety Training

The FLS will be routinely handling a variety of firearms; therefore, it is imperative that the FLS understand how to safely handle a firearm. All firearms must be treated as though they are loaded. This rule cannot be over-emphasized and must be followed at all times.

1.10.1 Safe Firearm Handling

- Always treat firearms as if they are loaded
- The muzzle of the firearm must always be pointed in a safe direction.
- Always wear appropriate eye and ear protection when shooting.

- Keep your finger out of the gun's trigger guard and off of the trigger until you have made the decision to fire.
- Always be certain that your target and the surrounding area are safe before firing.
- Test firing or any examination of the firearm that utilizes ammunition or an ammunition component, will only be performed in designated test firing areas.
- A firearm will not be returned to any agency in a loaded condition.

1.10.2 Training Assignments

1.10.2.1 Attend a Basic Firearm Safety Course at a local police department, online or complete a comprehensive review of firearm handling and safety with the TC. Discuss the course with the TC and document information learned.

1.10.2.2 Study and become familiar with the DFS Safety Manual and the Firearm/Toolmark Technical Procedures Manual as it relates to safely handling and test firing firearms.

1.11 Modes of Evaluation

1.11.1 Oral Session

1.11.2 Written Examination

2 EVIDENCE HANDLING

2.1 Objectives

2.1.1 To understand the fundamentals of evidence security and evidence handling procedures.

2.1.2 To become knowledgeable with the LIMS as it pertains to chain of custody and the transfer of evidence.

2.2 Modes of Instruction

2.2.1 Demonstration by the TC of evidence handling and section storage procedures

2.2.2 Self-directed study through reading assignments, study questions and practical exercises.

2.3 Assignments

2.3.1 Completion of required reading (2.7)

2.3.2 Study questions

2.3.3 Practical exercises

2.4 Study Questions

2.4.1 Explain the chain of custody documentation methods used by the Department.

2.4.2 Define a proper seal.

2.4.3 What is the proper way to mark evidence?

2.4.4 Who has access to the main evidence storage room in the section? Your personal locker?

2.4.5 Who has access to your work area?

2.4.6 Describe the procedures for access to your locker in your absence.

2.4.7 Explain the lock box procedure.

2.4.8 Explain how to handle evidence which also needs a latent print analysis.

2.4.9 Explain how to handle evidence which also needs a DNA analysis.

2.4.10 Define the following terms:

- chain of custody
- lock box
- evidence seal
- convenience packaging
- RFLE
- FS Lab #
- LIMS

2.4.11 What is a container?

2.4.12 What is the pathway that an item of evidence goes through from the time it enters DFS to the time it is returned to the agency?

2.4.13 Describe the duties of the “primary examiner”. How is the “primary examiner” determined?

2.5 Practical Exercises

2.5.1 Demonstration of proper chain of custody practices with the TC.

2.5.2 Demonstration of section evidence handling and storage procedures, including evidence transfers to/from Evidence Receiving personnel and other sections within the laboratory.

2.6 Mode of Evaluation

Written Examination

Upon completion of this module, a memorandum of qualification documenting competency in the area of Evidence Handling will be provided by the TC to the Section Supervisor, who will route it to the appropriate Lab Director for authorization to independently transfer/handle containers of evidence within this section as necessary.

2.7 Required Reading

2.7.1 Quality Manual - Sections 14, 15 and 23

2.7.2 Firearm/Toolmark Procedures Manual

3 QUALITY ASSURANCE AND MAINTENANCE

3.1 Objectives

3.1.1 To become knowledgeable with the equipment/instrumentation utilized in the firearm/toolmark laboratory, including maintenance and Quality Assurance (QA) procedures.

3.1.2 To become knowledgeable with the chemicals and reference standards utilized in the firearm/toolmark laboratory, including the storage, maintenance and QA procedures.

3.1.3 To become knowledgeable with other duties related to section maintenance.

3.2 Modes of Instruction

3.2.1 Self-directed study questions and practical exercises

3.2.2 Observations

3.3 Assignments

3.3.1 Completion of required reading (3.7)

3.3.2 Study questions

3.3.3 Practical exercises

3.4 Study Questions

3.4.1 Describe the laboratory's QA procedures that are in place to ensure that the equipment and instrumentation used in the firearm/toolmark laboratory are performing up to specifications.

3.4.2 Describe the laboratory's QA procedures for: routine calibration checks, reagent inventory/preparation, and section's reference standards.

3.5 Practical Exercises

3.5.1 Discuss with TC the maintenance and performance checks associated ~~ion~~ with the following equipment/instrumentation:

- Rulers/Tape measures
- Digital micrometer
- Digital caliper
- Perspective Enterprises Device
- Balances
- Comparison Microscope
- Stereomicroscope (with reticle)
- Trigger pull weights
- Klarmann Rulings Stage micrometer
- NIBIN

3.5.2 Discuss with TC the use and maintenance (as applicable) of the following equipment:

- Inertial bullet puller
- Remote firing device
- Sonicator

3.5.3 Discuss with TC the use and maintenance of the bullet recovery tank and firing range.

3.5.4 Discuss with TC the use and maintenance of the laboratory's reference collections (firearms, ammunition, etc.).

3.5.5 Discuss with TC the proper preparation, storage/disposal, and performance checks for the following:

- Serial number restoration chemicals
- Distance determination chemicals
- Standard/Reference materials

3.5.6 Discuss with TC other duties that may be assigned as necessary/applicable, including, but not limited to, the following:

- Purchasing/Procurement
- Equipment Inventory
- Evidence Inventory
- Administrative duties
- Assisting in casework or training activities

3.6 Modes of Evaluation

3.6.1 Practical Exercises

3.6.2 Oral Session

3.7 Required Reading

Firearm/Toolmark Procedures Manual – Section 11 Quality Assurance

4 AMMUNITION

4.1 Objectives

To become familiar with current manufacturing processes of ammunition and ammunition components.

4.2 Modes of Instruction

4.2.1 Self-directed through reading assignments, training assignments, study questions and practical exercises

4.2.2 Observations

4.3 Assignments

4.3.1 NIJ Firearms Examiner Training on-line Module 5 (Small Arms Ammunition)

4.3.2 Study Questions

4.3.3 Practical Exercises

4.4 Study Questions

4.4.1 Define the following terms from the current version of the AFTE Glossary:

- Ammunition
- Blank
- Buckshot
- Buffer
- Bullet
- Cartridge
- Centerfire
- Downloading
- Grain
- Gunpowder
- Headspace
- Headstamp
- Pellet
- Primer
- Projectile
- Propellant
- Rimfire
- Shot
- Shot cartridge
- Shotshell
- Shotshell case
- Slug
- Wad

4.4.2 Define caliber

4.4.3 Explain the meaning of the +P / +P+ designation in a headstamp

4.4.4 List the metric equivalents of the following cartridges: 223 Remington, 25 Auto, 32 Auto, 380 Auto, 9mm Luger, 9mm Makarov.

4.4.5 What does the designation “30” in caliber 30-30 Winchester and 30-06 Springfield indicate?

4.4.6 What do the numerical designations in 7.62 x 39mm each refer to?

4.4.7 What are the differences between 22 Short, 22 Long, and 22 Long Rifle cartridges?

4.4.8 Define gauge.

4.5 Practical Exercises

4.5.1 Discuss the following bullet designs and types with the TC:

- 22 Short
- 22 Long
- 22 Long Rifle
- 22 Winchester Magnum
- 25 Auto
- 32 Auto
- 32 S&W
- 32 S&W Long (Colt New Police)
- 32 H&R Magnum
- 32 Short Colt
- 380 Auto
- 9mm Luger
- 9mm Makarov
- 38 Special
- 357 Magnum
- 357 SIG
- 38 S&W (Colt New Police)
- 38 Short Colt
- 38 Long Colt
- 10 mm Auto
- 40 S&W
- 41 (Remington) Magnum
- (Remington) Magnum
- (S&W) Special
- 45 Auto
- 45 GAP
- 45 Colt
- 50 Action Express
- 30-30 Winchester
- 30-06 Springfield
- 270 Winchester
- 30 Carbine
- 5.56 NATO
- 7.62 x 39 Soviet
- 308 Winchester
- 223 Remington
- Lead Round Nose (LRN)
- Wadcutter (WC)
- Semi-wadcutter (SWC)
- Full Metal Jacket (FMJ)
- Total Metal Jacket (TMJ)
- (Semi-) Jacketed Soft Point (SJSP / JSP)
- (Semi-) Jacketed Hollow Point (SJHP / JHP
- Gas Check (GC)Bullet/Jacket Material:
- Copper-Coated / Lubaloy
- Brass-Coated
- Copper-Jacketed
- Brass-Jacketed
- Nickel-Jacketed
- Aluminum-Jacketed
- Frangible
- Teflon-coated (KTW)

4.5.2 Record the following information, using terms from the current version of the AFTE Glossary, for ten items of ammunition (selected by the TC as being the most commonly seen in that region):

4.5.2.1 Type of cartridge (ex. centerfire/rimfire)

4.5.2.2 Type of bullet (e.g., lead, jacketed hollow point, round nose)

4.5.2.3 Using available headstamp guide resources identify the manufacturer of the ammunition provided.

4.5.3 Compare the following cartridges and describe their interchangeability:

- 45 Auto and 45 GAP
- 10 mm Auto and 40 S&W
- 44 Magnum and 44 Special
- 9mm Luger and 357 SIG
- 22 Rimfires
- 357 Magnum, 38 Special, and 38 S&W
- 9mm Luger, 380 Auto, and 9mm Makarov
- 32 S&W and 32 Auto

4.6 Modes of Evaluation

4.6.1 Practical Examination

The FLS will receive twenty cartridges/shotshells and document the manufacturer, caliber, bullet load/design of each.

4.6.2 Oral Session

4.6.3 Written Examination

4.7 Required Reading

Barnes, F.C., Cartridges of the World: 10th Edition, DBI Books, Inc., Northfield, IL, 2003, pp. 7-10.

5 FIREARMS

5.1 Objectives

5.1.1 To be able to explain the mechanisms of function and safety features on a variety of firearms.

5.1.2 To be able to field strip and test fire a variety of firearms.

5.1.3 To be able to discuss a variety of mechanical malfunctions encountered in the examinations of firearms.

5.2 Modes of Instruction

5.2.1 Self-directed through required reading assignments, study questions and practical exercises

5.2.2 Observations

5.3 Assignments

5.3.1 Completion of required reading (5.14)

5.3.2 Study Questions

5.3.3 Practical Exercises

5.4 Firearm Examination - Study Questions

5.4.1 Define the following terms from the current version of the AFTE Glossary:

- Revolver
- Derringer
- Pistol
- Semiautomatic
- Automatic
- Bore obstruction
- Broken extractor
- Push off
- Slam fire
- Improper timing
- Jar off
- Accidental discharge
- Battery (in and out of battery)
- Malfunction
- Misfire
- Misfeed
- Stove pipe
- Break open
- Bolt action
- Lever action
- Slide/pump action
- Single shot
- Muzzleloader
- Percussion firearm

5.4.2 Define the following terms from the current version of the AFTE Glossary:

- Action
- Barrel
- Bore
- Breech
- Breechface
- Butt
- Chamber
- Direction of Twist
- Double Action
- Ejection
- Extraction
- Firearm
- Firing pin
- Frame
- Function testing
- Grip
- Hammer
- Handgun
- Muzzle
- Rifling
- Safety mechanism
- Single action
- Test fire
- Trigger
- Trigger guard
- Trigger pull

5.4.3 Where is the serial number located? Do all firearms have a serial number? Why or why not?

5.4.4 Define the following terms from the current version of the AFTE Glossary:

- Class Characteristics
- Breechface marks
- General rifling characteristics
- Rifling

- Polygonal rifling
- Ejector marks
- Extractor marks
- Firing pin drag mark
- Firing pin impression

5.4.5 What are the different types of breechface marks?

5.4.6 What are the different types of firing pin impression shapes?

5.5 Revolvers – Study Questions

5.5.1 Define the following terms from the current version of the AFTE Glossary:

- Crane
- Cylinder
- Cylinder alignment
- Ejector Rod
- Loading gate
- Hammer Notch
- Hammer Spur
- Hammer block
- Transfer bar

5.5.2 Discuss with the TC how the following safeties function and how to check their function:

- Hammer block
- Safety notch / quarter cock, half cock
- Rebounding hammer
- Transfer bar
- Key lock

5.5.3 Explain the cycle of fire as it relates to single/double action revolvers.

5.5.4 What does the direction of cylinder stop notches on a revolver indicate?

5.5.5 What is a top break revolver?

5.5.6 Describe the differences between the following types of cylinders in a revolver: hinged, swing-out, and pin type (fixed).

5.6 Revolvers - Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload some of the firearms listed. Demonstrate these safety techniques to the instructor. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

Document each firearm on a firearm worksheet, including the safety features. Obtain a copy of an exploded drawing of each of the firearms listed below.

R.G. Industries model RG23, caliber 22 Long Rifle
- Test fire two (2) 22 Long Rifle cartridges

Ruger New Model Single-Six, caliber 22 Magnum
- Test fire two (2) 22 Magnum cartridges

Iver Johnson model Top Break, caliber 32 Smith & Wesson
- Test fire two (2) 32 S&W cartridges
- Test fire two (2) 32 Auto cartridges

Smith & Wesson model 686, caliber 357 Magnum
- Test fire two (2) 357 Magnum cartridges

Colt model Lawman, caliber 357 Magnum
- Test fire two (2) 38 Special cartridges

Ruger model Security Six, caliber 357 Magnum
- Test fire two (2) 38 Special cartridges

5.7 Pistols – Study Questions

5.7.1 Discuss the following types of semi-automatic pistol action:

- Blowback action
- Gas operated
- Recoil operated
- Hybrid Action

5.7.2 Define the following terms using the current version of the AFTE Glossary:

- Backstrap
- Chamber
- Front Strap
- Ejector
- Ejection port
- Extractor
- Magazine
- Receiver
- Inertia firing pin
- Striker
- Magazine well
- Slide
- Slide Stop

5.7.3 Discuss with the TC how the following safeties function and how to check their operability:

- Grip safety
- Magazine safety
- Thumb/manual safety
- Decocker
- Trigger safety
- Disconnect
- Cocking indicator
- Loaded chamber indicator
- Firing pin block
- Key

5.7.4 Explain the cycle of fire for a semiautomatic pistol.

5.7.5 Describe how to perform a function check on a pistol with an exposed hammer versus a striker fired pistol.

5.8 Pistols - Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload some of the firearms listed. Demonstrate these safety techniques to the instructor. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection

Document each firearm on a firearm worksheet, including the safety features and their actions. Obtain a copy of an exploded drawing of each of the firearms listed below. In addition, use the remote firing device for at least two of the firearms (one down range and one into the water tank).

Ruger model MKII, caliber 22 Long Rifle
- Test fire two (2) 22 Long Rifle cartridges

Phoenix Arms model HP 22, caliber 22 Long Rifle
- Test fire two (2) 22 Long Rifle cartridges

Jennings model J-22, caliber 22 Long Rifle
- Test fire two (2) 22 Long Rifle cartridges

Davis Industries model D22, caliber 22 Long Rifle derringer
- Test fire two (2) 22 Long Rifle cartridges

Beretta model 950BS, caliber 25 Auto
- Test fire two (2) 25 Auto cartridges

Raven model P-25 or MP-25, caliber 25 Auto
- Test fire two (2) 25 Auto cartridges
- Field strip

Bersa model Thunder 380, caliber 380 Auto
- Test fire two (2) 380 Auto cartridges

Ruger model LCP, caliber 380 Auto
- Test fire two (2) 380 Auto cartridges

Walther model PPK, caliber 380 Auto
- Test fire two (2) 380 Auto cartridges

Baikal model IJ-70, caliber 9mm Makarov
- Test fire two (2) 9mm Makarov cartridges
- Test fire two (2) 380 Auto cartridges

Beretta model 92, caliber 9mm Luger
- Test fire two (2) 9mm Luger cartridges

Intratec model Tec-9, caliber 9mm Luger
- Test fire two (2) 9mm Luger cartridges

Jimenez Arms model J.A. Nine, caliber 9mm Luger
- Test fire two (2) 9mm Luger cartridges

Hi-Point model C9, caliber 9mm Luger
- Test fire two (2) 9mm Luger cartridges
- Test fire two (2) 380 Auto cartridges
- Field strip

Ruger P-series, caliber 9mm Luger
- Test fire two (2) 9mm Luger cartridges

Glock model 31, caliber 357 SIG
- Test fire two (2) 357 SIG cartridges
- Field strip

Ruger model SR40c, caliber 40 S&W
- Test fire two (2) 40 S&W cartridges

Smith & Wesson model SD40VE, caliber 40 S&W
- Test fire two (2) 40 S&W Speer cartridges
- Field Strip

Springfield Armory model XD-40, caliber 40 S&W
- Test fire two (2) 40 S&W cartridges

Smith & Wesson model 1006, caliber 10 mm Auto
- Test fire two (2) 40 S&W cartridges
- Test fire two (2) 10mm Auto cartridges

IMI/Magnum Research model Desert Eagle, caliber 357 Magnum
- Test fire two (2) 357 Magnum cartridges

Colt model 1911A1, caliber 45 Auto
- Test fire two (2) 45 Auto cartridges
- Field strip

Taurus model PT 145 Millennium Pro, caliber 45 Auto
- Test fire two (2) 45 Auto cartridges

Heckler & Koch Model USP, caliber 45 Auto
- Test fire two (2) 45 Auto cartridges

5.9 Rifles - Study Questions

5.9.1 Define the following terms using the current version of the AFTE Glossary:

- Long gun
- Carbine
- Rifle
- Stock
- Stripper Clip
- Machine gun
- Rotating bolt
- Flash suppressor
- Floating firing pin

5.9.2 Describe the function of a cross bolt safety.

5.9.3 Why can only blunt-nose bullets be used in tubular magazines?

5.9.4 What is selective fire?

5.9.5 What does it mean to fire from an open bolt?

5.9.6 Describe the differences between an AK-47 and SKS.

5.9.7 Describe how to perform a function check on a lever action rifle.

5.10 Rifles - Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload some of the firearms listed. Demonstrate these safety techniques to the instructor. Have an instructor function check all firearms before returning them to the firearm reference collection.

Document each firearm on a firearm worksheet, including the safety features. Obtain a copy of an exploded drawing of each of the firearms listed below. In addition, use the remote firing device down range for at least one of the firearms.

Winchester model 94 caliber 30-30 Winchester
- Test fire two (2) 30-30 Winchester cartridges

Savage model 340 Series E caliber 30-30 Winchester
- Test fire two (2) 30-30 Winchester cartridges

Norinco Type 56S (or other AK-type) caliber 7.62x39mm
- Test fire two (2) 7.62x39mm cartridges

Norinco model SKS rifle (or other SKS-type) caliber 7.62x39mm
- Test fire two (2) 7.62x39mm cartridges

Colt model HBAR rifle (or other M16/AR15 type) caliber 223 Remington
- Test fire two (2) 223 Remington cartridges

Ruger model Mini-14 caliber 223 Remington
- Test fire two (2) 223 Remington cartridges

5.11 Shotguns – Study Questions

Define the following terms using the current version of the AFTE Glossary:

- Choke
- Forearm
- Forend
- Shotgun
- Slide action
- Pump action
- Double barrel shotgun
- Over/under shotgun
- Side by side shotgun
- Automatic safety
- Barrel porting
- Recoil pad
- Combination gun
- Pistol grip

5.11.1 Discuss with the TC common safeties on shotguns and how to check their function.

5.12 Shotguns - Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload some of the firearms listed. Demonstrate these safety techniques to the instructor. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

Document each firearm on a firearm worksheet, including the safety features. Obtain a copy of an exploded drawing of each of the firearms listed below. In addition, use the remote firing device down range for at least one of the firearms.

Harrington & Richardson Topper Model 158, 12 gauge
- Test fire two (2) 12 gauge shotshells

Savage Stevens model 311E, 410 bore, side by side
- Test fire two (2) 410 shotshells in each barrel

Remington model 1100, 12 gauge
- Test fire two (2) 12 gauge shotshells

Browning model Light Twelve or Auto 5, 12 gauge
- Test fire two (2) 12 gauge shotshells

Remington model 870, 12 gauge
- Test fire two (2) 12 gauge shotshells

Mossberg model 500A, 12 gauge
- Test fire two (2) 12 gauge shotshells

Ithaca model 37R Featherlight, 16 gauge
- Test fire two (2) 16 gauge shotshells

5.13 Modes of Evaluation

5.13.1 Oral Sessions

5.13.2 Practical Exercises

Record the following information, as applicable, for fifteen fired ammunition components (selected by the TC):

- Number of lands and grooves, direction of twist, and type of rifling for each fired bullet
- Type of breechface marks and firing pin impression for each fired cartridge case
- Type of component for each fired shotshell component

5.14 Required Reading

5.14.1 Firearms Examination

5.14.1.1 Virginia Department of Forensic Science Firearm/Toolmark Procedures Manual – Physical Examination and Classification of Firearms.

5.14.1.2 NFSTC – “Section 08 - Examination of Firearms” - This course of instruction may be found at http://projects.nfstc.org/firearms

5.14.2 Firearm Safety Concerns

5.14.2.1 Dutton, G., “Firearms Safety in the Laboratory,” AFTE Journal, Vol. 29, No. 1, Winter 1997, pp. 37-41.

5.14.2.2 Greenspan, A., “The Case of the Unsafe Magazine Safety,” AFTE Journal, 1999, 31(3): 379-381.

6 EXAMINATION DOCUMENTATION AND COURT TESTIMONY

6.1 Objectives

6.1.1 To be able to follow the criteria in the QM and Firearms/Toolmark Procedures Manual in regard to note taking and chain of custody.

6.1.2 To become proficient in the operation of the LIMS as it pertains to note taking and chain of custody.

6.1.3 To become proficient presenting fact-based testimony in court.

6.2 Modes of Instruction

6.2.1 Self-directed study through reading assignments, study questions, and practical exercises

6.2.2 Observations

6.3 Assignments

6.3.1 Completion of required reading (6.7)

6.3.2 Study questions

6.3.3 Practical exercises

6.4 Study Questions

6.4.1 Define the following:

- Expert witness
- Voir dire
- Ethics
- Forensic science

6.4.2 Discuss non-verbal cues that can influence expert credibility.

6.4.3 Discuss evidence packaging and marking criteria as listed in the QM.

6.4.4 Discuss the general examination documentation requirements in the QM and the Firearm/Toolmark Procedures Manual.

6.5 Practical Exercises

6.5.1 Discuss with your TC the standards regarding note taking and chain of custody and as they relate to the QM and the Firearm/Toolmark Procedures Manual.

6.5.2 Discuss with your TC the standards regarding case file maintenance and location and courtroom testimony monitoring as they relate to the QM.

6.5.3 Discuss with your TC the operation of local, state and federal law enforcement agencies and court systems.

6.5.4 Observe an examiner testifying; discuss with your TC their demeanor and professionalism.

6.5.5 Confer with other examiners regarding experience and recommendations in regard to courtroom testimony.

6.5.6 Prepare a list of “qualification questions” which can be used by the prosecutor to qualify you as a witness. Discuss with your TC.

6.6 Modes of Evaluation

6.6.1 Practical Exercises

6.6.2 Oral Session

6.7 Required Reading

6.7.1 Dutton, Gerard, “Ethics in Forensic Firearm Investigation”, AFTE Journal, 2005; 37(2): 79-85.

6.7.2 Schroeder, Oliver C., J.D., "Ethical and Moral Dilemmas Confronting Forensic Scientists," Journal of Forensic Sciences, 1984; 29(4): 966-986.

6.7.3 Tanton, R.L., “Jury Preconceptions and Their Effect on Expert Scientific Testimony,” AFTE Journal, 1980; 12(2): 67-77.

6.7.4 Mogil, Hon. B. Marc, J.D., "Maximizing Your Courtroom Testimony," FBI Law Enforcement Bulletin, May 1989, p. 7-9.

6.7.5 Quality Manual – Section 17 Monitoring Results

6.7.6 Firearms and Toolmarks Procedure Manual Sections, referring to Examination Documentation

6.7.7 Sapir, Gil I. “Qualifying the Expert Witness: A Practical Voir Dire”, Forensic Magazine, March 2007 pp. 1 – 5

6.7.8 Pitera, Merrie Jo, “Courtroom Attire: Ensuring Witness Attire Makes the Right Statement,” American Society of Trial Consultants, Vol. 24, Issue 4, July 2012

7 NIBIN

7.1 Objectives

7.1.1 To attend and successfully complete the BATF/FTI NIBIN System Training

7.1.2 To become proficient in NIBIN entry

7.2 Modes of Instruction

7.2.1 Completion of the BATF/FTI NIBIN System Training Course

7.2.2 Self-directed study questions and practical exercises

7.2.3 Observations

7.3 Assignments

7.3.1 Complete NIBIN System pre-course material

7.3.2 Study and become familiar with the NIBIN training guide

7.3.3 Study questions

7.3.4 Practical exercises

7.4 Study Questions

7.4.1 What does NIBIN stand for?

7.4.2 What is IBIS and what does it stand for?

7.4.3 Describe the proper orientation for NIBIN entry for the following

- Centerfire: Parallel BFM
- Centerfire: Arched BFM
- Centerfire: Circular/Granular BFM
- Rimfire: Circular FPI
- Rimfire: Rectangular FPI

7.5 Practical Exercise

The FLS will complete 10 NIBIN entries under direct supervision of the TC.

7.6 Modes of Evaluation

7.6.1 Practical Exercises

7.6.2 Oral Session

7.6.3 Practical Test

7.7 Required Reading

7.7.1 IBIS BrassTrax User Guide

7.7.2 Firearm/Toolmark Procedures Manual – National Integrated Ballistics Information Network (NIBIN).