



Firearms Section

NIBIN Technician Training Manual

Comparative and Analytical Division



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Introduction to Trainee

This training program will guide you, as a NIBIN Technician trainee, through the various areas of knowledge integral to the field of ballistic imaging. It is paramount that you keep before you the objectives of this training period:

- To be able to independently and competently function test firearms,
- To test fire firearms,
- To recover test fired specimens,
- To evaluate fired cartridge cases for NIBIN entry,
- To enter fired cartridge cases into NIBIN.

The obligation is yours to maximize the effectiveness of the training period as an opportunity to learn substantial, valuable, and applicable information pertaining to this field. The extent to which you exert yourself during this training and evaluation period will bear directly on the quality of your performance in the laboratory. You have a moral and ethical obligation to prepare yourself technically and professionally during training to be able to perform according to the standards of the Houston Forensic Science Center (HFSC).

This training program provides a framework for addressing the most important part of your training. This on-the-job, hands-on experience is the core of your training and you will be assigned to work with a Principal Instructor during your training period. This will ensure that you have sufficiently covered each aspect of this training program and have a basis for continued development after your initial qualification. Your training will be monitored and assisted by your Principal Instructor, who has primary responsibility for training matters.

You will be expected to read and understand the Firearms Section's Standard Operating Procedures, the HFSC Quality Assurance Manual, and the HFSC Safety Manual as well as print, video, and physical reference files. Integral to your course of study will be frequent daily contacts with section personnel with special expertise in certain areas. Do not hesitate to ask anyone a question, whether a supervisor or examiner.

Your study will include many printed references, including the basic material listed within each area of study. It is expected that during the training period you will become thoroughly familiar with these basic references. Further, it should be noted that you should not restrict your efforts and research to those required references. One of your primary sources of additional information will



be the section's reference library. Familiarize yourself with the library's contents, including the reference files, related indices, manufacturers' literature, and the journal of the Association of Firearm and Toolmark Examiners.

In addition to maintenance of this manual, you will be required to keep a record of your study notes on each of the items shown in the training program. This record can include hand or type-written notes, charts, graphs, photographs, photocopied material, etc. What is included is at your discretion, but it must address and broaden on each of the required items of study set out in the training program. Organization of your records in a format that parallels the training program is suggested. This record will assist the documentation of your progress during training, and serve as a ready reference in the months and even years following the completion of training.

Written tests will require a grade of 80% or greater to pass. The student must receive a passing grade for all written tests to successfully complete the training program.



1. Unit 1 – Administrative Orientation

1.1. Sections

- 1.1.1. Houston Forensic Science Center (HFSC) New Hire Orientation
- 1.1.2. Tour
- 1.1.3. Firearms Section In-Processing

1.2. Training Objectives

To provide the trainee with an understanding of the mission of HFSC, the operation of the Firearms Section, as well as the other sections of the laboratory.

1.3. Method of Testing

Oral discussion

1.4. Training Methods

- 1.4.1. Self-directed study
- 1.4.2. Discussion
- 1.4.3. Tour of some or all sections of HFSC
- 1.4.4. HFSC New Hire Orientation (if applicable)

1.5. Practical Exercise

1.5.1. Firearms Section In-Processing

- 1.5.1.1. The student will read the section's Standard Operating Procedures and discuss the section's mission with the Principal Instructor. Discussions with the student are to include section and HFSC procedures.

Principal Instructor

Date

1.6. Reading

1.6.1. Required Reading

- HFSC Quality Manual
- Firearms Section Standard Operating Procedures
- HFSC Health and Safety Manual

1.7. Terminology



Common Acronyms

HFSC	Houston Forensic Science Center
SOP	Standard Operating Procedures
ANSI-ASQ	American National Standards Institute-American Society for Quality
ANAB	ANSI-ASQ National Accreditation Board

1.8. Estimated Training Time

40 hours



2. Unit 2 – Firearm Training

2.1. Sections

- 2.1.1. Handguns (Semiautomatic)
- 2.1.2. Long Guns (Semiautomatic)
- 2.1.3. Submachine Guns & Machine Guns
- 2.1.4. Firearm Terminology and Identification

2.2. Training Objectives

To develop in the student a thorough knowledge of semiautomatic handguns and semiautomatic/full automatic rifles so that he/she will know how to assemble and disassemble these firearm types, be familiar with firearm safety designs, and have a knowledge of operability of those weapons most frequently encountered. In addition, a working knowledge of firearm terminology will be developed.

2.3. Method of Testing

- 2.3.1. Written/practical examinations
- 2.3.2. Manual demonstration

2.4. Training Method

- 2.4.1. Reading
- 2.4.2. Discussion
- 2.4.3. Practical exercises

2.5. Practical Exercises

In the following practical exercises involving the disassembly of firearms, substitutions of similar types, makes, and models shall be done if any of the listed firearms cannot be obtained. The use of the section's videos is recommended if a particular firearm is not available. Use of various assembly/disassembly guides is recommended.

2.5.1. Handguns (Semiautomatic)

- 2.5.1.1. Review firearm safety and test firing rules with your Principal Instructor. Cite the rules and explain the reason for each rule.

Principal Instructor

Date



2.5.1.2. The student shall be required to function test and identify parts for the following types of firearms (assembly and disassembly should be done to the extent necessary for the student to show an understanding of the operating method/system and how the individual parts interact):

- Single action only recoil operated pistol (i.e. Model 1911/1911A1)
- Blowback operated pistol (i.e. Walther PPK/S)
- Gas operated pistol (i.e. 44 Magnum or 50 AE IMI Desert Eagle)
- Recoil operated double action only pistol (i.e. Glock 17)
- Recoil operated single action/double action pistol (i.e. Beretta 92S)
- Recoil operated pistol with a magazine disconnect (i.e. Browning Hi-Power)
- A single action only blowback pistol (i.e. Raven MP-25)

Principal Instructor

Date

2.5.1.3. The Principal Instructor shall give an **oral** practical examination involving at least two of the above listed firearms. The student shall discuss all the safety features of the included firearms, as well as the operating method/system and how the individual parts interact.

Principal Instructor

Date

2.5.2. Long Guns (Semiautomatic)

2.5.2.1. The student shall be required to function test and identify parts for the following types of firearms (assembly and disassembly shall be done to the extent necessary for the student to show an understanding of the operating method/system and how the individual parts interact):

- Gas operated carbine with a crossbolt safety (i.e. M-1 Carbine)
- Gas operated rifle with a trigger guard lever and hammer block (i.e. Ruger Mini-14)
- Gas operated rifle with a trigger guard lever (i.e. AKS/SKS type)

Principal Instructor

Date

2.5.2.2. The Principal Instructor shall give an **oral** practical examination involving at least two of the above listed firearms. The student shall discuss all the safety features of



the included firearms, as well as the operating method/system and how the individual parts interact.

Principal Instructor

Date

2.5.3. Submachine Guns & Machine Guns

2.5.3.1. The student shall be required to function test and identify parts for the following types of firearms (assembly and disassembly should be done to the extent necessary for the student to show an understanding of the operating method/system and how the individual parts interact):

- Blowback pistol (i.e. SWD/Cobray M-11)
- Gas operated rifle having different firing modes (i.e. AR-15, both selective fire and semiautomatic)
- Full automatic gas operated rifle (i.e. AK 47)
- Full automatic submachine gun that fires from open bolt (i.e. Uzi Model A)

Principal Instructor

Date

2.5.3.2. The Principal Instructor shall give an **oral** practical examination involving at least two of the above listed firearms. The student shall discuss all the safety features of the included firearms, as well as the operating method/system and how the individual parts interact.

Principal Instructor

Date

2.5.4. Firearm Terminology and Identification

2.5.4.1. Discuss with your Principal Instructor how to conduct an examination to determine if a firearm is capable of firing full automatic. Using firearms that are capable of firing full automatic from a closed bolt and an open bolt, conduct this type of examination and verbally report your findings.

Principal Instructor

Date

2.5.4.2. Explain and illustrate the differences between the operations of the following types of actions found in autoloading pistols and rifles:



- Blowback action
- Gas operated action
- Recoil operated action

Principal Instructor

Date

2.5.4.3. Define each of the following types of firearms and explain in detail the operations of each type to include the loading of cartridges and the subsequent movement of the cartridge case and/or bullet after firing.

- Autoloading pistol, single and double action
- Autoloading rifle
- Submachine gun
- Assault rifle

Principal Instructor

Date

2.5.4.4. Research, define, and/or determine the implications of the following terms as they relate to safety in the operation of a firearm:

- | | |
|---------------------------------------|-------------------------|
| • Inadequate/improper sear engagement | • False half-cock |
| • Bore obstruction | • Slam fire |
| • Barrel bulge | • Excessive headspacing |
| • Broken extractor | • Push off |
| • Rail splitting | • Excessive pressure |
| • Hairline cracks | • Dented barrel |
| • Defective safety | • High primer |

Principal Instructor

Date

2.5.4.5. Demonstrate your knowledge of the basic nomenclature of handguns and rifles.

2.5.4.5.1. Include, but do not restrict your study to the following:

- | | |
|--------------|------------|
| • Breechface | • Barrel |
| • Breechbolt | • Ramp |
| • Bolt | • Magazine |
| • Bolt face | • Clip |



- Extractor
- Ejector
- Firing pin
- Ejection port
- Receiver

2.5.4.5.2. Point out these parts in several handguns and rifles.

Principal Instructor

Date

2.5.4.6. Review and record the references in the Firearms Section library, which can be used to identify the manufacturer and/or source of a firearm using the following criteria:

- Proof marks
- Inspector marks
- Part numbers
- Company logos
- Serial number
- Factory numbers and markings

Principal Instructor

Date

2.6. Reading

2.6.1. Required Reading **for Handguns (Semiautomatic)**

- *Small Arms of the World, 9th or 10th Edition* by Smith; Chapter 12, pp. 179-192.
- *Military Pistols and Revolvers* by Ian V. Hogg; pp. 7-11 and 35-77.
- *American Pistol and Revolver Design and Performance* by L.R. Wallack; Chapters 3 and 4 and pp. 51, 69-70.
- *Book of Pistols & Revolvers* by Smith; pp. 36-43.
- *Guns and How They Work* by Ian V. Hogg; Everest House (1979); pp. 90-107.

2.6.2. Required Reading **for Long Guns (Semiautomatic)**

- *Small Arms of the World, 9th or 10th Edition* by Smith; Chapter 7 and Chapter 8 pp. 93, 104-107, and 641-642.
- *The Book of Rifles* by Smith; Chapter 6 and pp. 86-88.
- *Guns and How They Work* by Ian V. Hogg; Everest House (1979); pp. 125 (2nd paragraph)-131 and 148-157.

2.6.3. Required Reading **for Submachine Guns & Machine Guns**

- *Small Arms of the World, 9th or 10th Edition* by Smith; Chapters 8 and 9.
- *Guns and How They Work* by Ian V. Hogg; Everest House (1979); pp. 58-67, 80-89, 108-125, and 132-147.



- *The Worlds Submachine Guns, Vol. I* by Thomas B. Nelson, and Hans B. Lockhaven; T.B.N. Enterprises (1977); pp. 1-28; and briefly review remainder of text as necessary.
- *The Worlds Machine Pistols and Submachine Guns Vol. IIa* by Thomas B. Nelson and Daniel D. Musgrave; T.B.N. Enterprises (1980); Chapter III, pp. 95-104; Chapter V, pp.297-354; Chapter X, pp. 647-658; and briefly review remainder of text as necessary (esp. pp. 407-416, 507-522).
- *The Terrifying Three* by Duncan Long; Paladin Press (1989).

2.6.4. Required Reading for **Firearm Terminology and Identification**

- *The Story of Firearm Ignition* by James Edsall; Pioneer Press, 1974.
- *The Age of Firearms, A Pictorial History* by Robert Held; Gun Digest Company, 1970.
- *Cartridges; A Pictorial Digest of Small Arms Ammunition* by Herschel C. Logan; pp. 1-10; Standard Publication, 1959.
- *The Development of Firearms* by H.L. Peterson; Parts 1-3; American Rifleman, March-April-May, 1960.
- *The Complete Handgun* by Ian V. Hogg; – 1300 to the Present; Peerage Books, 1984.
- *The Story of the Gun* on the Arts & Entertainment (A&E) Channel - (Video).
- *Guns and How They Work* by Ian V. Hogg; Everest House (1979); pp. 6-25.
- *The Standard Directory of Proof Marks* by Gerhard Wirncherger; Blacksmith Publishers.
- *Gunmarks* by David Byron Crown Publishers (1979).
- *The Identification and Registration of Firearms* by Vaclav “Jack” Krcma; Charles C. Thomas (1971).

2.6.5. Other Reading (as necessary)

- *AFTE Journals* (as identified by Principal Instructor).
- *AFTE Glossary*.
- *Hatcher’s Notebook* by Hatcher, Chapters VII to IX, pp. 180-231.
- *Firearms Investigation, Identification, and Evidence* by Hatcher, Jury and Weller; The Stackpole Company (1957); Chapter 5, pp. 106-136 and 187-196.
- *Firearms Identification Vol. II* by J. Howard Mathews; Charles C. Thomas (1962); Part VI, pp. 467-492.
- *Firearms Identification Vol. III* by J. Howard Mathews; Charles C. Thomas (1962); Part VII, pp. 703-714.
- *American Pistol & Revolver Design and Performance* by L.R. Wallack; Winchester Press (1978); pp.71-80.



- *American Rifle Design and Performance* by L.R. Wallack; Winchester Press (1977); pp.71-88.
- *Encyclopedia of Modern Firearms, Parts and Assembly, Vol. 1* by F.R. "Bob" Brownell; (1959).

2.7. Terminology

Research the following terms using the AFTE Glossary and discuss each with your Principal Instructor. (If the term is not in the AFTE Glossary, consult with your Principal Instructor on how to research the term.):

2.7.1. Handguns (Semiautomatic)

ACP	Autoloading	Barrel
Bore	Bore Diameter	Bullet
Bullet Diameter	Caliber	Cartridge
Cock	Cocking Indicator	Delayed Fire (Hangfire)
Discharge	Firearm	Full Cock
Function Testing	Grip Safety	Gunpowder
Half Cock	Hammer	Hammer Strut
Lug, Barrel	Malfunction	Misfire
Muzzle	Obturation	Pistol
Projectile	Propellant	Semiautomatic
Stock		

2.7.2. Long Guns (Semiautomatic)

Barrel	Bolt Body	Bolt Carrier
Bolt Face	Bolt Handle	Bolt Release
Breech	Breechblock	Breech Bolt
Breech Face	Butt Plate	Feed Ramp
Firing Pin	Forearm	Function Testing
Hammer	In Battery	Locked
Locking Bolt	Muzzle	Out of Battery
Rifle	Single Action	Stripper Clip
Trigger	Trigger, Double Pull	Trigger Guard
Trigger Pull		

2.7.3. Submachine Guns & Machine Guns

Blowback	Bore Diameter	Brass
Breechface Markings	Clip	Disconnecter
Ejection	Ejection Port	Ejector



Extraction	Extractor	Full Automatic
Gas Operated	Gas Piston	Gas
Magazine	Magazine, Box	Gas Port
Magazine, Rotary	Magazine Floorplate	Magazine, Detachable
Magazine Lock	Magazine Well	Magazine Follower
NATO Cartridge	Open Bolt System	Muzzle Flash
Orifice	Pistol	Operating Handle
Receiver	Recoil	Piston
Recoil Spring	Recoil Spring Guide	Recoil Operation
Rifle	Rotating Barrel	Recoil Spring Plug
Slide	Slide Lock	Safety, Magazine

2.7.4. Firearm Terminology and Identification

Factory Markings	Inspector Mark	Logo
Part Number	Proof Mark	Serial Number

2.8. Estimated Training Time

248 hours total

2.8.1. **Handguns (Semiautomatic)** (32 hours)

2.8.2. **Long Guns (Semiautomatic)** (72 hours)

2.8.3. **Submachine Guns & Machine Guns** (72 hours)

2.8.4. **Firearm Terminology and Identification** (72 hours)



3. Unit 3 – Ammunition Development and Identification/Cartridge Loading and Ballistics

3.1. Sections

- 3.1.1. Cartridge Manufacture and Identification
- 3.1.2. Terminology Used in Cartridge Loading and Ballistics

3.2. Training Objectives

- 3.2.1. To develop in the student a thorough knowledge of the developments of gunpowder and ammunition, the relationship of cartridge improvement to firearm design, manufacturing methods of cartridges, and firearm terminology.
- 3.2.2. To teach the student the terminology used in cartridge loading and ballistics.

3.3. Method of Testing

- 3.3.1. Written/practical examination

3.4. Training Methods

- 3.4.1. Self-directed study
- 3.4.2. Practical exercises
- 3.4.3. Discussion

3.5. Practical Exercises

3.5.1. Cartridge Manufacture and Identification

- 3.5.1.1. Become familiar with the Firearm Section Standard Ammunition File (SAF) and/or its electronic equivalent.

Principal Instructor

Date

- 3.5.1.2. Discuss the range of bullet styles and weights based on the stock ammunition in the section's ammunition supply.

Principal Instructor

Date

- 3.5.1.3. Know and discuss the different cartridge case and primer materials and how these materials can affect the markings imparted to the cartridge case during the firing process.



Principal Instructor

Date

3.5.1.4. Know and discuss the difference between caliber and caliber class. Illustrate this difference by relating these terms to a discussion of the .22 caliber, .30 caliber and .38 caliber families of cartridges.

Principal Instructor

Date

3.6. Reading

3.6.1. Required Reading for Cartridge Manufacture and Identification

- Book of Pistols and Revolvers by Smith; pp. 23-25.
- Cartridges for Collectors by Datig; pp. 9 through 18.
- Pistol and Revolver Cartridges, Vols. I and II, by White and Munhall; revised by Bearse; pp. 1-13 in each volume.
- Small Arms of the World, 9th or 10th Edition, by Smith; pp. 43-47.
- Centerfire Pistol and Revolver Cartridges, by White, Munhall and Bearse; pp. 140-146.
- Cartridges of the World 7th Edition, by Barnes; Chapter 11; 8th Edition, Chapter 12; 7th Edition, Chapter 10.
- Ammunition Making by H. L. Peterson; NRA, 1990.
- Firearms Investigation, Identification, and Evidence by Hatcher, Jury, and Weller; Chapter 4 pp. 63-105.

3.6.2. Required Reading for Terminology Used in Cartridge Loading and Ballistics

- Lyman Reloaders Manual and Sierra Reloading Manual.
- Cartridges of the World 5th Edition by Barnes; Chapter 14.
- NRA Handloaders Guide, Chapters 1-8.
- Centerfire Pistol and Revolver Cartridges, by White, Munhall and Bearse, Volume II, Chapter 1.
- NRA Handloaders Guide, Chapter 9.
- Cartridges of the World 7th Edition by Barnes; Chapter 10.

3.6.3. Review as necessary

- Military Small Arms Ammunition of the World by P. Labbett; 1945-1980; Presidio Press, 1980.



3.7. Terminology

Research the following terms using the AFTE Glossary and discuss each with your Principal Instructor. (If the term is not in the AFTE Glossary, consult with your Principal Instructor on how to research the term.):

3.7.1. Cartridge Manufacture and Identification

Ammunition	Boattail Bullet	Bottleneck Cartridge
Brass	Brass-Coated Lead Bullet	Bullet
Cannelure	Cartridge	Cartridge Case
Copper Coated Lead Bullet	Crimp	Extractor Groove
Head	Headstamp	Hollow-Point Bullet
Jacketed Bullet	Mouth	Neck
Ogive	Primer	Rebated Rim Cartridge
Rimmed Cartridge	Rimless Cartridge	Round-Nosed Bullet
Semi-Rimmed Cartridge	Shoulder	Silvertip Bullet
Soft Point Bullet	Spitzer Bullet	Tapered Cartridge
Truncated-Nosed Bullet	Wadcutter Bullet	

3.7.2. Terminology Used in Cartridge Loading and Ballistics

Ammunition Color Code	Ammunition Lot	Ammunition, Ball
Ammunition, Match	Ammunition, Metallic	Brass Washed Bullet
Bullet, Armor Piercing	Bullet Casting	Bullet, Coated
Bullet, Copper Jacket	Bullet, Copper Washed	Bullet Core
Bullet Diameter	Bullet, Flat-Nosed	Bullet, Full Metal Case
Bullet, Full Metal Jacket	Bullet, Hollow Base	Bullet, Hollow Point
Bullet, Incendiary	Bullet Jacket	Bullet, Lead
Bullet, Plated	Bullet, Round Nose	Bullet, Semi-Jacketed Hollow Point
Bullet, Steel Jacketed	Bullet Puller	Caliber
Cartridge, Center Fire	Cartridge Designation	Cartridge, Magnum
Cartridge, Rimfire	Headspace	Grain
Load, Squib	Misfire	Necking Down
Pressure	Projectile	Reloading

3.8. Estimated Training Time

88 hours total

3.8.1. Cartridge Manufacture and Identification (16 hours)

3.8.2. Terminology Used in Cartridge Loading and Ballistics (72 hours)



4. Unit 4 – Handling of Evidence and Safety

4.1. Sections

- 4.1.1. Overview of Evidence Receiving and Transfer
- 4.1.2. Laboratory Safety

4.2. Training Objectives

To instruct the student in the proper methods of handling, preserving, and marking of evidence. Also the safe handling of firearms and a working knowledge of firearm terminology will be learned at the conclusion of this section.

4.3. Method of Testing

Written/practical examinations

4.4. Training Methods

- 4.4.1. Self-directed study
- 4.4.2. Practical exercises
- 4.4.3. Discussion

4.5. Practical Exercises

4.5.1. Overview of Evidence Receiving and Transfer

- 4.5.1.1. The student shall be taken through the procedure of receiving evidence for NIBIN processing. Emphasis shall be placed on actions with evidence discrepancies, checking for an unloaded condition in submitted firearms, and handling evidence in unusual circumstances.

Principal Instructor

Date

- 4.5.1.2. The student shall review all procedures pertaining to the marking of evidence and be given practical exercises in marking test fires.

Principal Instructor

Date

4.5.2. Laboratory Safety



4.5.2.1. Review the procedure for handling biohazardous substances with your Principal Instructor.

Principal Instructor

Date

4.6. Reading

4.6.1. Required reading

- HFSC Quality Manual
- Firearms Section Standard Operating Procedures
- HFSC Health and Safety Manual

4.7. Terminology

None

4.8. Estimated Training Time

40 hours



5. Unit 5 – LIMS and Report Writing

5.1. Sections

- 5.1.1. Overview of the Laboratory Information Management System (LIMS)
- 5.1.2. Writing reports

5.2. Training Objective

To instruct the student in the use of LIMS. The student will also gain experience in writing reports.

5.3. Method of Testing

Written/practical examinations

5.4. Training Method

- 5.4.1. Self-directed study
- 5.4.2. Practical exercises
- 5.4.3. Discussion

5.5. Practical Exercises

5.5.1. Overview of the Laboratory Information Management System (LIMS)

- 5.5.1.1. The student shall be shown the procedure for creating an assignment in LIMS and associating evidence items with the assignment. The student shall be shown how to create items and sub-items of evidence.

Principal Instructor

Date

- 5.5.1.2. The student will be shown how to complete the fields in matrix panels associated with IBIS requests. The student will be shown how to create appropriate worksheets in LIMS.

Principal Instructor

Date

- 5.5.1.3. The student should be shown how to query the LIMS for the following: pending requests assigned to him/her, pending AR/TR assigned to him/her (if applicable), common reports, and methods for searching the database for information.



Principal Instructor

Date

5.5.1.4. The student shall be taken through the procedure for querying LIMS for case/evidence information.

Principal Instructor

Date

5.5.2. Writing reports

5.5.2.1. The student will be shown how to properly create an IBIS notification/report in LIMS.

Principal Instructor

Date

5.6. Reading

- LIMS Training Manual (Current Edition)
- Firearms Section Standard Operating Procedures

5.7. Terminology

None

5.8. Estimated Training Time

40 hours



6. Unit 6 – Function Testing, Test Firing, and Specimen Recovery

6.1. Sections

- 6.1.1. Test Firing Rules
- 6.1.2. Selecting Ammunition for Test Firing
- 6.1.3. Test Firing and Bullet Recovery Methods
- 6.1.4. Function Testing Firearms

6.2. Training Objectives

To instruct the student in the proper methods of range safety procedures, basic firearm repair, preparing firearms for test firing, ammunition selection for test firing, test firing, bullet recovery devices, special equipment for firing unsafe weapons, and firearm terminology.

6.3. Method of Testing

Written/practical examinations

6.4. Training Methods

- 6.4.1. Self-directed study
- 6.4.2. Discussion

6.5. Practical Exercises

6.5.1. Test Firing Rules

- 6.5.1.1. Review the test firing safety rules, cite the rules and explain the reason for each rule.

Principal Instructor

Date

6.5.2. Selecting Ammunition for Test Firing

- 6.5.2.1. Familiarize yourself with the ammunition storage areas in the section. Know how to locate test ammunition. Discuss with your Principal Instructor the reasons for using substitute ammunition for test firing.

Principal Instructor

Date

6.5.3. Test Firing and Bullet Recovery Methods



6.5.3.1. Become knowledgeable about the capabilities in the section for the recovery of fired test bullets. Know when and how to use the horizontal recovery tank, backstop, and cotton box and their limitations. Observe and assist your Principal Instructor in the recovery of fired bullets using each of these methods. Know and observe all safety rules.

Principal Instructor

Date

6.5.3.2. The student will recover bullets fired from handguns and rifles into the various recovery mediums utilized by the Firearm Section.

Principal Instructor

Date

6.5.4. **Function Testing Firearms**

6.5.4.1. Students are to perform function tests (under the direct supervision of a trained analyst) on at least 20 firearms and will record the work performed. Firearms tested shall include semiautomatic pistols, semiautomatic rifles, and at least one 22 caliber rifle with a tubular magazine. All work will be entered in LIMS under the appropriate assignment.

Principal Instructor

Date

6.5.4.2. The student will test fire at least 20 firearms (under the direct supervision of a trained analyst) and will record the work performed. Firearms tested shall include semiautomatic pistols, semiautomatic rifles, and at least one 22 caliber rifle with a tubular magazine.

Principal Instructor

Date

6.6. Reading

6.6.1. Required Reading

- *Textbook of Firearms Investigation, Identification and Evidence* by Hatcher, Jury and Weller; (Pennsylvania: Stackpole company, 1957) pp. 235-239, Chapter 1.
- *Hatcher's Notebook* by Hatcher; (Pennsylvania: Stackpole Company, 1962), Chapters 7, 8, 12, 29, and 35.



- Problems and Advantages of Test Firing Weapons into Water, Journal of The Forensic Science Society, Vol. 6, No. 2, April 1966.
- Horizontal Water Recovery Tank by J.C. Cayton; AFTE Journal; Vol. 6, No. 1 (February 1974) pp. 23-24.
- Water Penetration Test, by L.R. Harden; AFTE Newsletter; Vol. 3, No. NL14 (June 1971) pp. 12-15.
- Firing Chamber and Safety Measures Taken in the Firearm and Toolmark Work Environment, by John Cayton; AFTE Journal; Vol. 17, No. 3 (July 1985), pp. 95-99.
- Firearms Safety in the Laboratory, by Gerard Dutton; AFTE Journal; Vol. 29, No. 1 (Winter 1997) pp. 37-41.
- The Identification of Firearms by Gunther & Gunther; (New York: John Wiley and Sons, 1935), p. 55.
- NRA Guide to Firearms Assembly, Vol. 3, 221.
- NRA Guide to Firearms Assembly, pp.117 and 239.

6.7. Terminology

Research the following terms using the AFTE Glossary and discuss each with your Principal Instructor. (If the term is not in the AFTE Glossary, consult with your Principal Instructor on how to research the term.):

Bullet Recovery System	Bullet Splash	Backstop
Cotton Box	Face Shield	Full Auto
Function Testing	Test Fire	Tubular Magazine
Vise	Water Tank	

6.8. Estimated Training Time

100 hours



7. Unit 7 – Instrumentation

7.1. Sections

None

7.2. Training Objectives

To instruct the student in the operation and maintenance of the instruments used in the Firearms Section and continue development of his/her knowledge of firearm terminology.

7.3. Method of Testing

Practical examinations

7.4. Training Methods

7.4.1. Self-directed study

7.4.2. Demonstration

7.4.3. Discussion

7.5. Practical Exercises

7.5.1. Differentiate between the following:

- Compound microscope
- Stereo microscope
- Comparison microscope

Principal Instructor

Date

7.5.2. Familiarize yourself with the mechanical and optical aspects of the comparison microscopes and stereo microscope in the Firearms Section. Your Principal Instructor will review these with you.

Principal Instructor

Date

7.5.3. Examine at least 20 sets of fired cartridge cases using a comparison microscope. Adjust the light sources with respect to angle and vary the intensity of the light source, if possible. Discuss this with your Principal Instructor.



Principal Instructor

Date

7.5.4. Become familiar with and demonstrate the use of an inertia bullet puller.

Principal Instructor

Date

7.6. Reading

7.6.1. Required Reading

- The Stereomicroscope Instrumentation and Techniques by Schlueter & Gumpertz; American Laboratory, April 1976
- Manufacturer’s Procedure and Operation Manuals
- The Microscope A Practical Guide, by G. H. Needham
- Firearms Identification, by Mathews; (Wisconsin: University Wisconsin Press, 1962), Vol. 1, Chapter 4.
- Firearms Investigation Identification and Evidence, by Hatcher, Jury and Weller; (Pennsylvania: The Stackpole Company, 1957); Chapter 10.
- Basic Optics by Claude Cook; AFTE Journal; Vol. 17, No. 4 (October 1985) pp. 24-29 and 38-52.

7.7. Terminology

Research the following terms using the AFTE Glossary and discuss each with your Principal Instructor. (If the term is not in the AFTE Glossary, consult with your Principal Instructor on how to research the term.):

Binocular Microscope	Calibration	Comparison Microscope
Compound Microscope	Inertia Bullet Puller	Magnification
Mounting Stage	Objective	Oblique Angle
Ocular lens	Scales (Grain/Gram)	Stereo Microscope

7.8. Estimated Training Time

40 hours



8. Unit 8 – Cartridge Case Examination and Comparison

8.1. Sections

- 8.1.1. Class Characteristics
- 8.1.2. Individual Characteristics

8.2. Training Objectives

To instruct the student in the methods used in the comparison of cartridge

8.3. Method of Testing

Practical examinations

8.4. Training Methods

- 8.4.1. Self-directed study
- 8.4.2. Practical exercises
- 8.4.3. Discussion

8.5. Practical Exercises

8.5.1. Class Characteristics

8.5.1.1. Review the section(s) of the Standard Operating Procedures covering the examination fired cartridge cases. Discuss with your Principal Instructor.

Principal Instructor

Date

8.5.1.2. Describe "class characteristics" as the phrase applies to markings on a fired cartridge case. Determine the types of marks that can be left on a cartridge case/cartridge during loading/extracting and firing. Review media (if available) regarding the slow motion of firing sequences using semiautomatic firearms.

Principal Instructor

Date

8.5.1.3. Using test cartridge cases, relate the markings imparted to the fired cartridge cases with the parts on the firearm which produced these markings. Note: Your Principal Instructor will provide the test fired casings and will conduct these examinations with you.



Principal Instructor

Date

8.5.2. Individual Characteristics

8.5.2.1. Using the test cartridge cases from step 8.5.1.3, microscopically inter-compare all the markings with each other.

8.5.2.1.1. Include the following types of markings in your microscopic comparisons:

- Firing pin impression
- Breechface marks
- Extractor marks
- Ejector marks

8.5.2.1.2. Describe “individual characteristics” as the phrase applies to markings on a fired cartridge case.

Principal Instructor

Date

8.6. Reading

8.6.1. Required Reading

- Firearms Identification, by Mathews; (Wisconsin: University Wisconsin Press, 1962); Vol. 1, Part. 1, Chapters 3 and 6.
- Firearms Investigation, Identification and Evidence, by Hatcher, Jury and Weller; (Pennsylvania: The Stackpole Company, 1957); pp. 285-304 and Chapters 12, 13, and 14.
- Introduction to Tool Marks, Firearms and the Striagraph, by Davis; (Illinois: Charles C. Thomas, 1958); Chapter 5.
- Identification of Firearms and Forensic Ballistics, by Burrard; (New York: A. S. Barnes and Co., 1962); Chapters 6, 8, and 9.
- The Identification of Firearms, by Gunther and Gunther; (New York: John Wiley & Sons, 1935); Chapter 1 pp. 13-102.
- Hatcher's Notebook, by Hatcher; (Pennsylvania: The Stackpole Company, 1957); Part 1, Chapter 35, and pp. 431-441.
- Scientific Evidence in Criminal Cases, by Moenssens and Inbau; (New York: The Foundation Press, 1978); Chapter 4 pp. 180-182.
- Forensic Science Handbook Vol. II, by Saferstein; (New Jersey: Prentice Hall, 1988); Chapter 8 pp. 430-434.



- AFTE Journal Index, by Terry LaVoy; (Tampa: TA LaVoy & Associates, 1999); Cartridge Case Section.
- AFTE Glossary.

8.7. Terminology

None

8.8. Estimated Training Time

280 hours



9. Unit 9 – NIBIN

9.1. Sections

None

9.2. Training Objective

To instruct the student in the use of the section's ballistic imaging program.

9.3. Method of Testing

Practical examination

9.4. Training Methods

9.4.1. Self-directed study

9.4.2. Practical exercises

9.4.3. Discussion

9.5. Practical Exercises

9.5.1. The student will explain what NIBIN and IBIS are and how they are related.

Principal Instructor

Date

9.5.2. Complete training on the IBIS/NIBIN system and become an authorized NIBIN user.

Principal Instructor

Date

9.5.3. Upon successful completion of an ATF approved NIBIN training program, the student will record at least 20 acquisitions and have them reviewed by the Principal Instructor for conformance to training standards.

Principal Instructor

Date

9.6. Required Reading

- NIBIN/IBIS training materials issued by Forensic Technology, Inc. (current edition).
- HFSC Firearms Section Standard Operating Procedures.



9.7. Terminology

None

9.8. Estimated Training Time

80 hours