Training Outline for the Comparison of Firearms Evidence

1.0 Purpose – This document provides an outline to familiarize the trainee with the history of forensic firearms identification, firearms manufacturing, ballistics, individual characteristics, and the presentation of evidence in court. Upon completion and final approval the trainee will be permitted to accept casework in the area of forensic firearms identification.

2.0 Scope – This training outline shall be followed by all trainees in the Firearms Unit regardless of experience level.

3.0 Module 1 – Forensic Firearms Identification History

3.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated knowledge of:

3.1.1 The history and development of forensic firearms identification.

3.2 Reading Assignments

- Unit Forensic Firearms Identification History Notebook
- Firearms Identification - Weller, Jury, and Hatcher
- Firearms Identification - Mathews

3.3 Exercises

3.3.1 Read the above literature pertaining to the history and development of forensic firearms identification.

3.4 Evaluation

3.4.1 Prepare an accurate report of at least 500 words on the evolution of Forensic Firearms Identification.

4.0 Module 2 – Firearms Manufacturing

4.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated knowledge of:

4.1.1 The methods of firearms manufacturing.

4.1.2 The manufacture of rifled barrels.

4.2 Reading Assignments

- Unit Firearms Manufacturing Notebook
- Firearms Identification - Jury, Weller, and Hatcher
- Firearms Identification - J.H. Mathews
- Machining for the Firearm Examiner – Precision Forensic Testing

4.3 Exercises

4.3.1 Read the above literature pertaining to firearms manufacturing.

4.3.2 Given a list of terms, define/identify them as they relate to firearms manufacturing.

4.3.3 Take a tour of various gun manufacturing facilities and observe the methods utilized in the manufacturing of firearms. Particular attention shall be paid to the methods used for manufacturing any part of a firearm that may leave marks useful in identifying a particular ammunition component to a particular gun (such as rifling, breech, firing pin, chamber, extractor, ejector, etc.). Write a brief description of the manufacturing processes used by each manufacturer visited. (Optional)

4.3.4 Examine one of the consecutively manufactured broached machined sample sets and compare and contrast the different machining marks present on the samples.

4.4 Evaluation

4.4.1 Successfully complete a written test on topics covered in the reading assignments and exercises.

5.0 Module 3 – Ballistics

5.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated knowledge of:

5.1.1 The fundamentals of ballistics including exterior, interior and terminal ballistics.

5.2 Reading Assignments

- Selected AFTE articles on exterior/external ballistics
- Selected AFTE articles on interior/internal ballistics
- Selected AFTE articles on terminal ballistics
- The Bullet's Flight, the Ballistics of Small Arms - Franklin W. Mann
- The Handbook of Cartridge Reloading - Hornaday Manufacturing Co.
- Nosler Reloading Manual - Nosler Bullets Incorporated
- Speer Reloading Manual for Rifle and Pistol - Speer Omark Industries
- Hodgdon Powder Data Manual
- Sierra Bullets Reloading Manual - Leisure Group Incorporated
- Rifle magazines
- Hand Loader magazines
- Selected articles on chronograph and chronograph techniques
- Oehler chronograph manual/magazine
- Gunshot Wounds; Practical Aspects of Firearms, Ballistics, and Forensic Techniques - Vincent J.M. DiMaio
- Wound Ballistics - United States Army Medical Department
- AFTE Glossary

5.3 Exercises

5.3.1 Read the above literature pertaining to ballistics.

5.3.2 Given a set of terms, define them as they relate to ballistics.

5.3.3 Given a set of study questions, answer all study questions related to ballistics.

5.3.4 Research signs of excessive pressure and prepare a listing of how and what you would look for in cases of suspected pressure problems.

5.4 Evaluation

5.4.1 Successfully complete a written test on topics covered in the reading assignments and exercises.

6.0 Module 4 – Individual Characteristics

6.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated knowledge of:

6.1.1 Terminology of bullet and cartridge case individual characteristics.

6.1.2 The various individual characteristics associated with bullet and cartridge cases.

6.2 Reading Assignments

- Unit Individual Characteristics Notebook
- Firearms Identification - J.H. Mathews
- Firearms Identification - Jury, Weller, and Hatcher
- Tool Marks and the Striagraph - John Davis
- AFTE Theory of Identification

6.3 Exercises

6.3.1 Read the above literature pertaining to individual characteristics and the theory of identification.

6.3.2 Given a set of terms, define them as they relate to individual characteristics.

6.3.3 Given a set of study questions, answer all study question related to individual characteristics.

6.3.4 Complete a consecutively manufactured barrel and/or breechface study. Compare the test fires from these guns against each other and correctly answer all related questions.

6.3.5 Compare the test bullets fired from firearms in the mechanics unit.

6.3.6 Compare the test cartridge cases fired in the mechanics unit. Examine firing pin impression, breechface marks and, if applicable, extractor, ejector, anvil marks and chamber marks.

6.3.7 Photograph a minimum of five identifications.

6.3.8 Discuss possible result statements and conclusions with the Training Officer or designee.

6.4 Evaluation

6.4.1 Successfully complete a written test on topics covered in the reading assignments and exercises.

6.4.2 Given a practical problem of one or more unknown fired bullets and/or fired cartridge cases, reach the proper finding(s) when these bullets and/or fired cartridge cases are compared to test bullets and/or fired cartridge cases fired from known firearms.

7.0 Module 5 – Presentation of Evidence in Court – Part II

7.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated knowledge of:

7.1.1 Court related terminology and the various steps in the court process.

7.2 Reading Assignments (from Part I)

- Lesson Plan, "Court Preparation Training for NC State Crime Laboratory Personnel"
- Perspectives in Expert Testimony, West Virginia University Online Course
- Arrest, Search, and Investigation in North Carolina [Chapter 6 – Rules of Evidence in Criminal Cases] - Robert L. Farb
- Moran, Bruce, "Firearms Examiner Expert Witness Testimony: The Forensic Firearms Identification Process Including Criteria for Identification and Distance Determination," AFTE Journal, Summer 2000: 231-251
- Scientific Working Group for Firearms and Toolmarks (SWGGUN) Admissibility Resource Kit (ARK)
- References located on the laboratory shared drive:
  - Law 101: Legal Guide for the Forensic Expert, 2011 < http://law101.dna.gov>
  - Overview of Expert Testimony and Being an Expert Witness, 2010

7.3 Exercises

7.3.1 Review the above literature pertaining to presentation of evidence in court from Part I if necessary.

7.3.2 Prepare responses to qualifying questions and review with the Training Officer or designee. It should be noted that although it is not possible to provide a list of all the questions that might be posed in a courtroom, the following will provide some insight into the type of questioning an expert witness may experience:

- What type of education, training and experience do you have that qualifies you as an expert in the field of forensic firearms identification?
- How many comparisons would you estimate that you have made to determine whether or not a particular [bullet/cartridge case/shotgun shell] was fired from a particular firearm?

- Have you testified before as an expert in the field of forensic firearms identification? If so, how many times?
- What is forensic firearms identification?
- What makes an identification possible?
- What characteristics do you consider when examining a [bullet/cartridge case/shotgun shell] to determine whether or not it has been fired from a particular firearm?

7.3.3 Testify as an expert witness in a moot court setting based on the analysis of one or more competency cases. Performance will be recorded on a Moot Court Evaluation Rating Sheet. Review moot court testimony with the Training Officer and other senior Forensic Scientists.

7.3.4 The trainee shall attend court and observe the testimony of senior Forensic Scientists as available.

7.3.5 Update Curriculum Vitae.

7.4 Evaluation

7.4.1 Complete a mock case.

7.4.2 Successfully testify in a moot court.

7.4.3 Successfully complete a final written test.

8.0 Records

- Training file
- Training checklist

9.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
07/01/2016	1	Original Document
09/22/2017	2	Updated header information. Changed title to remove Phase II designation. **6.3.5** & **6.3.6** – remove photography requirement. New **6.3.7** **7.3.4** – remove FSM coordination **7.4.3** – remove Phase II