SWGGUN Systemic Requirements/Recommendations for the Forensic Firearm and Toolmark Laboratory

PREAMBLE

The Scientific Working Group for Firearms and Toolmarks (SWGGUN) was established by the FBI in 1998 as an international body of experts that are representative of the experience and knowledge in the discipline of Firearm and Toolmark Identification. The group is comprised of 20 regular board members, an American Society of Crime Lab Directors (ASCLD) representative and the current President of the Association of Firearm and Tool Mark Examiners (AFTE).[1]

The Scientific Working Groups have been tasked by the National Academy of Sciences (NAS) in the report entitled Strengthening Forensic Science in the United States: A Path Forward 2 with directing the forensic science communities in the establishment of standardized procedures and protocols. The following document is in response to this request.

The following requirements/recommendations have been approved by the SWGGUN Board Members. While not enforceable, the following minimum standards are strongly encouraged to be adopted by laboratory management to ensure the reliability of Firearm and Toolmark examination results.

INTRODUCTION

The Science of Firearm/Toolmark Identification continues to be challenged by critics within the legal community and the media. The National Academy of Sciences has issued reports critical of the scientific foundations of the discipline. [2,3] Other critics in the legal and academic fields have identified mistakes made by crime laboratories which have resulted in massive overhauls of the identified systems and evaluations of previous casework of the affected examiners. [9-13] These critics have argued that there is a lack of empirical research and that the validity of the science has yet to be established.[9-13] They also claim that the methods which examiners employ during the examination and evaluation of firearm and toolmark evidence have yet to be standardized. [9-12]

The reliability of the science has been demonstrated and supported through proficiency tests and validity studies over many decades.[14] The calculated error rates indicate that the conclusions reached are accurate when appropriate methods are followed by a competent examiner.[14] Methods and standards have been established

by the Association of Firearm and Tool Mark Examiners (AFTE), the Scientific Working Group for Firearms and Toolmarks (SWGGUN) and the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB). However, many of these standards and guidelines are presently recommendations and have not been mandated or universally applied across the United States.

Errors in casework that have been identified appear to have been caused by examiners with poor ethical standards, inadequate training, scientifically unsound protocols and/or working under undue pressure to produce results.[4-8] Apparently, the laboratories identified lacked sufficient quality assurance measures necessary to ensure a reliable work product.

The Scientific Working Group for Firearm and Toolmark Identification (SWGGUN) provides the following requirements/recommendations to guide forensic science laboratory management in the development and maintenance of a competent Firearm and Toolmark Identification Unit. Through proper training, ethical standards, continued education and a comprehensive quality assurance program, the reliability of the science can be demonstrated.

EXAMINER QUALIFICATIONS

A comprehensive training program is essential to ensure that an examiner obtains the knowledge and skills necessary to accurately evaluate evidence and articulate examination conclusions in reports and during testimony. A quality training program will typically take between 18 and 30 months, and will require direction from a qualified examiner who will serve as a Training Officer.

The SWGGUN guidelines recommend that a firearm and toolmark trainee possess a minimum of a "Bachelor's degree in a natural/physical science based field of study from an accredited academic institution." (SWGGUN Minimum Qualifications for Firearm and Toolmark Examiner Trainees)

A sound training program will include all areas in which the trainee will become qualified. Training modules should include the following:

1. Administrative Matters and Procedures
2. Background/History of Firearms Identification and Current Trends
3. Firearms and Ammunition Development and Current Trends
4. Manufacture of Modern Firearms
5. Manufacture of Modern Ammunition
6. Instrumentation
7. Examination of Firearms
8. Bullet Examinations and Comparisons
9. Cartridge/Cartridge Case Examinations and Comparisons
10. Shotshell/Shotshell Component Examinations and Comparisons
11. Gunshot Residue Examinations and Distance Determinations
12. Toolmark Examinations and Comparisons

13. Serial Number Restoration
14. Case Documentation, Report Writing and Expert Testimony
15. Ethics

The trainee will be tested through the use of **training assignments**, practical exercises and competency tests. An examiner will gain technical knowledge through training assignments that will consist of collecting information utilizing available resources including books, scientific journals, relevant periodicals, reference firearm and ammunition collections, internet, lectures and personal communications with subject matter experts. The application of this technical information will be in the form of **practical exercises**. These exercises include hands-on examinations of specimens which demonstrate the trainee's ability to apply the knowledge gained during the training assignments. A trainee's proficiency of a technique or procedure will be evaluated by the training officer through the use of written, oral or demonstrative competency tests. The results of these tests must be documented and retained. Successful completion of **competency tests** is necessary to satisfy the requirements of a particular module.

Trainees are to be afforded the opportunity to attend manufacturing facilities including those that produce firearms, tools and ammunition. Observing these manufacturing processes is essential to understanding the fundamental propositions on which the science of Firearm and Toolmark Identification is based.

Examiners will demonstrate their ability to professionally communicate the technical knowledge acquired during training through successful completion of mock cases, oral boards and moot courts. **Mock cases** are designed to be similar to casework and will encompass techniques and procedures covered during training. Technical competency will be evaluated through **oral board** assessments by subject matter experts. Upon successful completion of the oral boards and mock cases, a trainee will be evaluated through **moot courts**. The trainee will be expected to successfully articulate the scientific foundations, examination procedures and results.

Certification will be granted to the examiner by the training laboratory upon successful completion of the training program. External certifications are available through organizations such as the Association of Firearm and Tool Mark Examiners and the American Board of Criminalistics.

The newly qualified examiner will continue to be monitored through supervised casework until deemed appropriate by the training officer. Qualified examiners are to be afforded a minimum of 20 hours annually to pursue continuing education in their areas of expertise. An examiner must stay abreast of developments within the field of Firearm and Toolmark Identification by reading relevant scientific literature and through continuing education activities such as attending conferences, armorers courses, manufacturing tours and/or participating in research.

QUALITY ASSURANCE MEASURES

A comprehensive quality assurance program will be established to ensure the quality of the work product is reliable. The following measures are essential in instituting a comprehensive quality assurance program.

Standardized procedures will be developed by a laboratory to provide guidance in the examination, documentation and reporting of firearm and toolmark related evidence. Part of the standardized procedures will include a verification process where an independent check of the evidence is performed by an individual having expertise in the discipline (SWGGUN Quality Assurance Guidelines).

A **technical review** of the case file documentation will be performed by another qualified examiner to ensure that the proper procedures were utilized and that the data collected supports the conclusions reported. An **administrative review** will be performed to ensure that the case file is complete, has been properly documented and reported results were in accordance with the laboratory's policies.

Annual **proficiency tests** will be completed by each examiner in the disciplines in which they are qualified. **Testimony Evaluation** will be performed periodically and documented by appropriate personnel. This evaluation will be reviewed by the supervisor and discussed with the examiner.

Internal and/or external audits of the laboratory will be performed periodically to ensure compliance with laboratory policies and procedures, standards established within the discipline and standards established by accrediting bodies. These audits will include a **case file review** of a representative sample of the cases completed by each examiner to ensure that all case documentation complies with the policies of the laboratory and the standards established within the discipline.

The SWGGUN strongly urges that laboratories performing Firearm and Toolmark Identification work be accredited by an external accrediting body such as the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) or Forensic Quality Services-International (FQS-I).

References:

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