MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

MIAMI-DADE POLICE DEPARTMENT
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MIAMI, FLORIDA 33172-1505

August 8, 2012

The Honorable Patrick J. Leahy
United States Senate
Committee on the Judiciary
224 Dirksen Senate Office Building
Washington, D.C. 20510-6275

Dear Senator Leahy:

Thank you for the opportunity to testify at the Senate Committee on the Judiciary hearing entitled "Improving Forensic Science in the Criminal Justice System" on July 18, 2012. The following information is provided in response to the questions asked by Committee members regarding a recently published study by the Miami-Dade Police Department Crime Laboratory on the accuracy of firearms identification.

Published Ruger Study:

The Miami-Dade Police Department Crime Laboratory conducted a research study on *The Repeatability and Uniqueness of Striations/Impressions on Fired Cartridge Casings Fired in 10 Consecutively Manufactured 9mm Ruger Slides* to improve the understanding of the accuracy, reliability, and measurement validity in the firearm and tool mark discipline of forensic science. The foundation of firearm and tool mark identification is that each firearm/tool produces a signature of identification (striation/impression) that is unique to that firearm/tool, and through the examination of the individual striations/impressions, the signature can be positively identified to the firearm/tool that produced it.

The 2009 National Academy of Sciences (NAS) Report, entitled *Strengthening Forensic Science in the United States: A Path Forward*, questioned the repeatability and uniqueness of striations/impressions left on fired evidence as well as the validity and error rate in firearm identification. This study analyzed the repeatability and uniqueness of striations/impressions on fired cartridge casings fired in 10 consecutively manufactured Ruger slides (one semi-automatic pistol and nine additional consecutively manufactured slides) by analyzing breech face striations/impressions through an evaluation of the participants' accuracy in making correct identifications. Although these slides were consecutively manufactured with the same equipment/tools, their signatures should still be different.

Test sets assembled included test fired casings from each slide, as well as unknowns. Participants were firearm & tool mark examiners throughout the United States. One hundred and fifty-eight test sets were distributed to laboratories in 46 states and the District of Columbia. The test sets were designed to evaluate an examiner's ability to correctly identify cartridge casings fired from 10 consecutively manufactured Ruger Slides to test fired cartridge casings fired from the same slides. This empirical study established an error rate of less than 0.1 percent.

This project was supported by Award No. 2009-DN-BX-K230 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. This research paper can be retrieved from: https://www.ncjrs.gov/pdffiles1/nij/grants/237960.pdf. In addition to the above study, the current state of research encompasses a variety of studies from crime laboratories and academia in the discipline of firearm and tool mark identification:

With regard to the question asked by Committee members about the current state of research overall on the validity of firearm identification, the following information is provided:

Durability:

In 2011, a Durability Study was conducted at the Miami-Dade Police Department Crime Laboratory: *Comparison of 15,000 Consecutively Fired Casings from a 9mm Glock Model 26 Semiautomatic Pistol* (will be submitted for publication in the *Association of Firearm and Tool Mark Examiners'* journal). This study was conducted to determine if the tool marks on the head of fired casings would still be identifiable over the course of firing 15,000 cartridges from a 9mm Glock semiautomatic pistol. The fired casings were collected at 25 round intervals. Examination of the class and individual characteristics on the breech face of these fired casings reveled significant changes in the firing pin impression, while changes to the breech face markings and firing pin aperture shearing were minor. Casing number one was identified with casing number 15,001.

Glock Enhanced Bullet Identification System (EBIS) Barrels

The Miami-Dade Police Department Crime Laboratory is currently conducting research under Award No. 2010-DN-BX-K269 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. The purpose of this research is to conduct an empirical study to evaluate the reproducibility and uniqueness of striations/impressions imparted to consecutively manufactured Glock Enhanced Bullet Identification System (EBIS) barrels with the same EBIS pattern, as well as to determine the error rate for the identification of same gun evidence. The MDPD has been researching/evaluating the Glock barrel since 1994. The Glock EBIS barrel is a polygonal barrel, which has a bar code like pattern added to it during the manufacturing

process. This study will analyze the repeatability and uniqueness of striations/impressions on spent/fired bullets fired in 10 consecutively manufactured Glock EBIS barrels with the same EBIS pattern by analyzing their striations/impressions. Consecutively manufactured EBIS barrels with the same EBIS pattern are significant to the study because these barrels were manufactured with the same equipment/tools and exhibit the same EBIS pattern. Even though these barrels are consecutively made, their signatures should still be different. Test sets were assembled and distributed to 147 crime laboratories and the project is in the 5th month of data collection. Currently, 180 participants have returned their questionnaire/answer sheets. Thirty-four of the participants did not meet the eligibility-inclusion criteria, resulting in 146 participants. Some laboratories had multiple participants. The results of this study will also examine whether firearm and tool mark examiners will be able to identify unknown bullets fired through consecutively manufactured Glock EBIS barrels to the firearms that fired them utilizing individual, unique and repeatable striations/impressions and whether the experience level of firearm and tool mark examiners will affect results when examining bullets fired through consecutively manufactured Glock EBIS barrels.

Additional Glock EBIS barrel papers published by the Miami-Dade Police Department Crime Laboratory are enclosed:

Carr, J. and Fadul, T. (1997), The Miami Barrel. AFTE Journal, 29: 232-234.

Fadul, T. and Nunez, A. (2003), The Miami Barrel Saga Continues. AFTE Journal, 35: 290-297.

Fadul, T. and Nunez, A. (2006), Glock's New "EBIS" Barrel: The Finale to the Miami Barrel Saga. AFTE Journal, 38: 96-100.

Fadul, T. (2011), An Empirical Study to Evaluate the Repeatability and Uniqueness of Striations/Impressions Imparted on Consecutively Manufactured Glock EBIS Gun Barrels, AFTE Journal, 43: 37-44.

Proposed Study:

The Ames Laboratory at the Midwest Forensic Resource Center, in collaboration with the American Society of Crime Laboratory Directors/Forensic Research Committee, will conduct an empirical study to evaluate type 1 and type 2 errors for cartridge casing comparisons. The proposed project will investigate the abilities of firearms examiners to identify same gun evidence. Participants will receive a total of fifteen (15) sets in each collection. Each set will contain three (3) cartridge cases collected from the same handgun and one cartridge case in question. The participants will be requested to only

compare the questioned casing with the three known test fires that are within a particular set and render an opinion of an Identification, Exclusion, Inconclusive, or Unsuitable. If the opinion is deemed Inconclusive, the participant will also be requested to provide a basis for this call. No other comparisons of the questioned casing will be requested. This "pair-wise" approach of only comparing one questioned casing with one group of known test fires (produced from the same firearm) addresses some potential interpretation problems and comparison biases that may be introduced when a "closed" sample set is used. The participants will be asked to report whether three, two, one, or none of the known test fires have adequately reproduced marks for comparison and whether the marks are adequate to confirm an identification between the known test fires from the known same source. This information will be used to measure a rate of production of casings with poorly reproduced marks.

Further, a compilation of published research conducted to support the foundation of the Firearm and Toolmark discipline is also enclosed.

Thank you for the opportunity to provide this information.

Sincerely,

Stephanie Stoiloff, Commander
Miami-Dade Police Department
Forensic Services Bureau