SUPERIOR COURT OF THE DISTRICT OF COLUMBIA

Criminal Division

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| UNITED STATES OF AMERICAv.ANTWAN HOLCOMB  | ::::::::: | Case No. 2010 CF1 4496Judge SatterfieldTrial: February 2, 2011 |

## MOTION IN LIMINE TO LIMIT CONCLUSIONS OF FIREARM EXAMINER

Mr. Antwan Holcomb respectfully moves this Court to limit the firearm identification testimony the government intends to elicit, pursuant to the Due Process Clause of the Fifth Amendment and the rule of *Dyas v. United States*, 376 A.2d 827 (D.C. 1977), and *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

Upon information and belief, the government will attempt to provide testimony that a bullet recovered from the AWIK complainant “matched” a separate bullet recovered from the decedent to a “practical certainty and to a reasonable degree of certainty in the field of firearm and toolmark identification.” This language is taken from Judge Leibovitz’s Order in *U.S. v. Anderson*, 2009 CF1 20672, attached as Exhibit F.[1](#_bookmark0)

The defense objects to that language because it still communicates to the factfinder a proposition not generally accepted in the relevant scientific community[2](#_bookmark1): that, essentially, the examiner is sure (“to a practical certainty”) that the bullets were fired by the same firearm to the

1 Three shell casings from the AWIK case were compared to the shell casing recovered from the homicide case (HO09-913). A positive match could not be made due to the lack of markings on both sets of shell casings. It was determined that both sets were .380 in caliber. This motion does not challenge that testimony.

2 This is the standard for admissibility under *Frye*.

exclusion of all others., The defense seeks to limit the examiner to testify to a more scientifically

acceptable association of “cannot exclude,” i.e. that based on class characteristics, the examiner cannot exclude the possibility that the bullet from the AWIK scene was fired from the same firearm as the bullet from the murder scene.

In litigation over the past two years, the government has conceded that its firearm examiners cannot reliably link markings on a bullet or cartridge casing to a particular firearm to an “absolute certainty.,” The National Research Council – in a report that reflects the scientific

community’s most recent and comprehensive study of the forensic sciences in the United States

* “was quite clear that the firearms and toolmark discipline has not established that its practitioners can reliably match patterns of markings to a particular firearm to any degree of

certainty, much less the high degrees of certainty communicated by these two formulations.”

**Commented [b1]:** I think you are referring back to the “practical certainty” and “reasonable degree of certainty in the field of firearm and toolmark identification” but you’re referencing something two paragraphs back. Maybe bracket these formulations within this quote, or mention the formations again before this sentence.

[3](#_bookmark2)

Affidavit of Donald Kennedy, attached as Exhibit A, at para. 8.

This Motion explains why the government’s proposed language is the subject of debate in the relevant scientific community and thus not generally accepted, why the methodology used to arrive at the conclusions proposed by the government violates *Frye/Dyas*, why the defense’s proposed limitation is generally accepted, and why ~~is~~ the Court cannot simply~~just~~ adopt the

flawed decision by Judge Leibovitz in *Anderson*.

3 Dr. Kennedy is the embodiment of the intellectual rigor and expertise that populates the National Research Council and National Academy of Sciences. He received his Ph.D from Harvard in 1956; has served on the faculty of Stanford, including as the Chair of its Biology Department, for decades; served as the Editor-in-Chief of *Science*, the peer-reviewed journal of the American Academy for the Advancement of Science (AAAS) for eight years; and is not only a member of the National Academy of Sciences, but served as Co-Chair of its standing Committee on Science, Technology and the Law. *See* Kennedy Affidavit (Exh. A), at paras. 1-2. ~~His affidavit is presented for the first time in this case.~~

## Debate in the relevant scientific community

There has been a dramatic change in the longstanding – and previously unchallenged – acceptance of firearm identification.[4](#_bookmark3) Scientists and experts in the relevant community have examined the claims of individuality[5](#_bookmark4) made by most firearms examiners and the subjective “method” typically used by firearms examiners when making comparisons and found both the

claims and the “method” wholly lacking in scientific rigor. “[T]he current state of generally- accepted scientific research,” *id.*, is presented in a recent, peer-reviewed report produced by a committee of “members of the forensic science community, legal community, and a diverse group of scientists” who were selected by the National Research Council[6](#_bookmark5) to assess the state of forensic science. *Strengthening Forensic Science in the United States: A Path Forward,* Committee on Identifying the Needs of the Forensic Sciences Community, National Research Council [hereinafter NRC Forensic Science Report] (Feb. 2009).

In particular, the findings and conclusions of the NRC Forensic Science report, along with the studies cited therein, describe a lack of general acceptance in the scientific community for (1) the fundamental assumptions of “uniqueness” and “reproducibility” of toolmarks produced by firearms; (2) the subjective methodology for identifying “individual” characteristics; and (3) the practice of declaring a “match” in the absence of a statistical or scientific foundation for that claim.

4 Of course, this Court “must consider . . . the current state of generally-accepted scientific research” underpinning the proposed expert testimony. *See Benn v. United States*, 978 A.2d 1257, 1278 (D.C. 2009). The fact that firearms testimony has been admitted in the past with certain specific conclusions does not moot this issue.

5 Firearm and toolmark examiners typically present individuality claims as a match from a bullet or cartridge case to one specific firearm to the exclusion of all other firearms in the world.

6 The National Research Council is the National Academy of Sciences’ operating agency. *See* National Academy of Sciences, *About the NAS*, *available at*<http://www.nasonline.org/site/PageServer?pagename=ABOUT_main_page>(last visited Feb. 23, 2010).

*See* NRC Forensic Science Report at 150-55. After researching the issue extensively, the NRC committee concluded that these assumptions, methodologies and practices are currently not supported by science. “[T]here is a substantial debate within the scientific community, as well as the Courts, regarding the degree to which firearms toolmark identification evidence passes muster,” and “in this debate . . . the latest scientific consensus is as expressed in the NRC Forensic Science Report.” *United States v. Mouzone*, Crim. No. WDQ-08-086, 2009 WL 3617748 at \*17, \*28 (D. Md. Oct. 29, 2009).

## The fundamental assumptions of uniqueness and reproducibility in FATM analysis lack empirical support.

Firearms examiners must make two fundamental assumptions in order to identify tool marks on bullets and cartridge casings as having been produced by a particular firearm. First, firearms examiners must assume that the tool marks produced by a particular gun are “unique” to

that gun. and could not have been made by any other gun in the world. Second, firearms examiners must assume that the unique tool marks “reproduce”; that is, they are present on every bullet and cartridge casing fired from the same gun at different times. These assumptions form the foundations upon which the discipline of firearms and toolmark examination is based. In the absence of the first assumption (uniqueness), there would be no basis to conclude that bullets or cartridge casings were fired from a particular gun based on tool marks. Without the second (reproducibility), there would be no basis to believe that firearms examiners could make that conclusion by comparing bullets and cartridge casings found at a crime scene with exemplars produced during later “test” firings. The NRC reviewed the available literature and found that these fundamental assumptions of “uniqueness” and “reproducibility” are unproven and largely untested, and consequently they are not accepted by the relevant scientific community.

**Commented [b2]:** I don’t think this is the claim that FATM examiners are making, and I don’t think this is a very strong point. In all of testimony I’ve read on this issue, the expert always says, “of course we can’t say that this is unique exclusive to every other gun in the world – it would require doing the impossible of testing every gun!” That’s not our plea, and it’s a red herring that allows them to easily attack our position. All we want – all scientists want – is a sufficient number of studies of high enough population size testing the variability of firearm marks. We don’t want a census and no one seriously thinks a census is possible. We just want a statistically valid sample of gunmarks. It could be that, statistically speaking, the bullet could be individualized to a gun without examining every gun in the world. But individualization would always – always – be a matter of degree

**Commented [b3]:** Again, we are speaking in absolute terms rather than statistical terms.

**Commented [b4]:** We need to cite to some BS ATFE articles here or the NRC report or something, particularly if we are using absolutist language.

“[T]he scientific knowledge base for toolmark and firearms analysis is fairly limited,” and “[t]he validity of the fundamental assumptions of uniqueness and reproducibility of firearms- related toolmarks has not yet been fully demonstrated.” NRC Forensic Science Report at 154,

155. The smattering of studies that exist “suggest a heavy reliance on the subjective findings of examiners rather than on the rigorous quantification and analysis of sources of variability [in the production of tool marks].” *Id.* This is unacceptable to the broader scientific community, which demands that theoretical assumptions be validated through empirical research before they can be relied upon with any confidence in application. *See id.* at 112 (describing the essential processes of hypothesis testing, methodical data collection, and developing limits of uncertainty).

The community of FATM practitioners has even ignored those in their own circles who have expressed concern that “[a]s the techniques of firearms manufacture have evolved, following mostly commercial rather than forensic arguments, this hypothesis [of uniqueness] needs to be verified on a regular basis.” M.S. Bonfanti & J. De Kinder, *The Influence of Manufacturing Processes on the Identification of Bullets and Cartridge Cases - A Review of the Literature*, 39 Sci. & Justice 4 (1999). At present, the foundational assumptions of firearms comparison examinations lack the empirical support to be accepted by the scientific community: “[a] significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to quantitatively characterize the probability of uniqueness.” *Id.* at 154 (quoting NRC, *Ballistics Imaging* (2008) at 3).[7](#_bookmark6) *See also* ‘*Badly Fragmented’ Forensic Science System Needs Overhaul; Evidence To Support Reliability Of*

7 “Ballistic Imaging” was produced by a group of twenty-two scientists with training and experience in areas of materials science, metallurgy, statistics, laboratory procedures and protocols, and computer science, in consultation with firearms examiners themselves. While the committee was not charged with examining the reliability of firearms identification as a discipline, it had to examine the discipline in order to determine the feasibility and utility of a national ballistics imaging database. Similar to the NRC Forensic Science Report, courts have found the Ballistics Imaging Report “particularly credible in evaluating the scientific status . . . of firearms toolmark identification methodology.” *Mouzone*, 2009 WL 3617748 at \*15.

*Many Techniques Is Lacking* [hereinafter NRC Press Release],[8](#_bookmark7) National Research Council (2009) (“for many other forensic disciplines – such as fingerprint and toolmark analysis – no studies have been conducted of large populations to determine how many sources might share the same or similar features”).

## FATM practitioners’ subjective methodology is unvalidated and conclusions drawn using this methodology has not been proven reliable.

Even assuming that firearms produce unique individual markings on cartridge casings and bullets, the claim that firearms examiners are able to reliably distinguish and meaningfully compare unique individual markings is not generally accepted in the relevant scientific community. The NRC found that firearms examiners’ unvalidated methodology is perhaps even more worrisome than the FATM discipline’s untested foundational assumptions. “A fundamental problem with toolmark and firearms analysis is the lack of a precisely defined process.” NRC Forensic Science Report at 155. While the NRC agreed that the AFTE theory’s “sufficient agreement” standard is “the best guidance available for the field of toolmark identification,” *id.*, they were emphatic that it did not meet the expectations of the scientific community. As they pointed out, the AFTE theory does not provide a protocol at all, but rather leaves it to the examiner to make a “subjective decision based on unarticulated standards.” *Id.* at 153-55. “This AFTE document . . . does not even consider, let alone address, questions regarding variability, reliability, repeatability, or the number of correlations needed to achieve a given degree of confidence.” *Id.* at 155.

For example, central to the assertion that firearms examiners can determine whether the markings on a bullet or cartridge casing match a particular gun is the claim that they can reliably

8 *Available at* <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12589>(last visited Feb. 17, 2010).

distinguish “individual” markings from subclass markings that will be transferred to bullets and cartridge casings fired from *any* firearm in the same lot of weapons. Examples of problematic subclass characteristics (i.e. markings that may appear to be unique but are actually common to a specific make and model of gun) are rife in the literature and are publicly acknowledged to present serious problems for the possibility of making correct identifications. ~~See supra fn. 11 and~~

~~accompanying text and~~ *~~See supra~~* ~~fn. 11 and accompanying text, and~~ Figure 1-1. Even the National

**Commented [b5]:** We don’t have a fn. 11, yet, unless you mean infra

Institute of Justice (the U.S. Department of Justice’s research arm) notes that the examiner should “research the manufacturing processes related to a particular make and model” of firearm to minimize subclass effects. *See* Module 9, Physical Characteristics, *available at* [http://www.ojp.usdoj.gov/nij/training/firearms-training/module09/fir\_m09\_t05\_02.htm.](http://www.ojp.usdoj.gov/nij/training/firearms-training/module09/fir_m09_t05_02.htm) Yet

AFTE theory does not require the examiner to familiarize herself with the firearm manufacturing

process or more specifically, the kinds of subclass characteristics imparted by different firearms.

**Commented [b6]:** Given a particular expert, the judge’s response to this is, “okay maybe not, but this particular expert HAS familiarized himself/herself with the manufacturing process.” In Mulderig’s transcripts he says exactly that during voir dire –claims to have been to 15 different nationally known gun/bullet manufacturers.

Further, firearm comparisons are conducted in a “show-up” fashion, where the bullet or cartridge case collected from the scene is compared against test fires from the suspect firearm and no others. *See United States v. Taylor*, 633 F.Supp.2d 1170, 1178 (D.N.M. 2009) (finding that FATM examiners’ “method of testing is, in effect, an evidentiary show-up, not what scientists would regard as a blind test.”). This practice has two implications: First, it not only fails to control for, but actually heightens the already -considerable chance of interpretational

bias inherent in FATM examinations. *See* NRC Forensic Science Report at 8 n. 8, 124 ~~(“The~~

findings of forensic science experts are vulnerable to cognitive and contextual bias”). Firearm

examiners are often given contextual information about the case and the evidence before they

**Commented [b7]:** Meh… this seems like too weak a quote to include here after our more extreme statement. I’m okay with just leaving it out. It sufficiently supports our statement, but if we leave it out I doubt a judge is going to go find the cite. Maybe we could find stronger language from other documents to include.

perform their examinations, and no standard operating procedure exists to prohibit or limit the

amount of contextual information an examiner has during the examination procedure.[9](#_bookmark8) Second,

**Commented [b8]:** Cite? Not sure if we need what I’ve put in the footnote, but I’m preserving the content of a footnote I deleted later on (that was used as the basis for this passage).

the “show up” practice compounds the problem described above – the examiner testifies to the ~~exclusion of all other firearms~~with such certainty about one firearm, without knowledge of or

studies into potential subclass marks produced by these firearms, and without even firing other firearms of the same make and model to minimally test assumptions of uniqueness of observed

marks and the reliability of his “methodology” in identifying them. As one court recently noted,

**Commented [b9]:** This is a broad declaration – we should have a cite for it. Of course if we say this in a motion you know the expert is going to get on the stand and say – “yep I’m familiar with studies on subclass markings.”

“the ‘science’ of matching toolmarks to shell casings and ***excluding all other items but the one tested*** as having made those marks is not without its critics”—leading the court to predict that that FATM identification evidence might not “even be admissible” at trial. *United States v. Lape*, 2010 WL 909756 at \*4 (S.D. Ohio Mar. 11, 2010) (emphasis added).[10](#_bookmark10)

This lack of a defined methodology and lack of safeguards against subclass influence and bias is further compounded by the fact that the AFTE theory itself, with its “increasingly obvious limitations,” *Mouzone*, 2009 WL 3617748 at \*20, has not been validated. In the wake of the NRC’s Report, even the president of the American Academy of Forensic Sciences – the most comprehensive and respected of the forensic science organizations (and the organization that edits and publishes the Journal of Forensic Sciences) – agrees that “[t]ool mark analysis . . . can be subject to validation but nevertheless appear[s] never to have been studied for this purpose.” Bohan editorial, *supra*, at 7. Absent studies establishing the ability of firearms examiners to reliably distinguish subclass from individual characteristics using the AFTE methodology, the

1. ~~However, i~~It is in the~~se~~ fields ~~that are~~ most at risk of bias effects that the least efforts have been made to

understand these “effects and methods for minimizing them.” NRC Forensic Science Report at*~~Id.~~* ~~a~~t 124. “Unfortunately, at least to date, there is no good evidence to indicate that the forensic science community has made

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a sufficient effort to address the bias issue.” *Id.* at 8 and n.8.

1. This dubious practice and the arguments set forth by its critics (*i.e.* the NRC committee) led the *Lape* court to find that despite a FATM match “there is no clear and convincing evidence that [defendant] committed the crime” and thus to order the defendant’s pretrial release. *Lape*, 2010 WL 909756 at \*4.

relevant scientific community does not generally accept the claim that examiners ~~of firearms~~ ~~examiners that they~~ are able to reliably make this distinction

**Commented [b10]:** Awesome footnote

.[11](#_bookmark9)

The NRC was also critical of FATM practitioners’ failure to employ a validated quantitative cutoff – *e.g.,* a certain number of consecutive matching individual striae with no intervening unmatching striae – for declaring a match, a problem part-and-parcel with the overall failure to validate FATM methodology. This inability to establish a standard for minimum points of comparison leaves firearms examiners particularly vulnerable to “subclass characteristics that could easily be mistaken for individual characteristics, and might lead an examiner to make a false positive identification,”[12](#_bookmark12) and is a natural consequence of the dearth of information about tool mark analysis’ fundamental assumptions of uniqueness and reproducibility. “Because not enough is known about the variabilities among individual tools and guns, we are not able to specify how many points of similarity are necessary for a given level of confidence in the result.” NRC Forensic Science Report at 154; *see also United States v. Glynn*, 578 F.Supp.2d 567, 574 (S.D.N.Y. Sept. 22, 2008) (commenting that FATM “lacks defining standards to a degree that exceeds most other kinds of forensic expertise, and noting that unlike fingerprint analysis, FATM analysis fails to employ a minimum point standard). This

11 FATM practitioners frequently cite to one study in particular in support of their claim that they can reliably make this distinction. The problems with this study – the Hamby and Brundage ten gun study discussed in the NRC Forensic Science Report at fn. 65 (page 155) and accompanying text – are legion. The number of consecutive barrels studied (10) is too small to be meaningful. The testing was unblind, meaning that test takers knew the exact nature of the test – a consecutive barrel study with no “extra” non-matching bullets. The bullets were fired into a watertank, so they were not damaged in the way bullets tend to be in casework. Only one type of firearm was studied, and one type of ammunition – and that one firearm was manufactured in 1985, before updates to the manufacturing process. *See, e.g.*, Baldwin et al., Statistical Tools, *supra*, at 2. The study is a “subjective evaluation” without documentation, such as photography, and thus is “only of value to the examiner who conducted the study.” *Criteria for Identification*, *supra*, at 19. Further, the study’s author – James Hamby – is a far cry from the objective scientist. Hamby was eventually fired from his role as director of a forensic laboratory for influencing forensic technicians to withhold information regarding testing irregularities and for concealing improper testing protocol. *See Final Report of Special Prosecuting Attorney*, Marion County Superior Court (2004), *available at* [http://www.athenahq.com/News/Jim%20Hamby/Special%20Prosecutor%20Report.PDF.](http://www.athenahq.com/News/Jim%20Hamby/Special%20Prosecutor%20Report.PDF)

12 Rivera, *supra*, at 247

gaping hole in the FATM discipline’s knowledge base puts individual examiners in the position of drawing conclusions based on a shifting, subjective “I know it when I see it” standard that varies from one examiner to the next, as opposed to the kind of validated, objective benchmarks implied by their absolutist claims.[13](#_bookmark11)

## The practice of claiming a “match” in the absence of a statistical or scientific foundation for such a claim is scientifically unacceptable.

In firearms analysis, as “[i]n most forensic science disciplines, no studies have been conducted of large populations to establish the uniqueness of marks or features. Yet, despite the

lack of a statistical foundation, examiners make probabilistic claims based on their experience.”

**Commented [b11]:** Small point, but we frequently call attention to the forensic sciences as a whole, or lump firearms with fingerprints in some of our quotes. I think we run the risk of a judge who is agreeing with us until broader forensic science issues are addressed. A judge might be willing to exclude firearms testimony, but unwilling to restrict all forensic science testimony. We gain traction with this kind of judge by pointing out that firearms are particularly terrible, and not that we’re just leveling the same old criticisms of forensic sciences in general.

NRC Forensic Science Report at 189. Here, that “probabilistic claim” will likely take the form of testimony that tool marks on the cartridge cases and bullets in this case “match” the recovered firearm “to the exclusion of all other firearms,” and “to a practical certainty” or “to a reasonable degree of scientific certainty” or words to this effect.

The NRC found such testimony scientifically unacceptable,~~soundly rejected this kind of~~

testimony, finding that the field of firearms comparisons has not yet “been rigorously shown to

have the capacity to consistently and with a high degree of certainty support conclusions about

**Commented [b12]:** It sounded like the NRC is a court of law… thus the change. Court’s always going to say NRC does not explicitly say anything about how the courts should handle this issue.

‘individualization’ (more commonly known as ‘matching’ of an unknown item of evidence to a

13 ~~A final problem identified by the NRC with the method employed by FATM examiners is the failure to account~~ ~~and control for bias. Firearm examiners are often given contextual information about the case and the evidence they~~ ~~are given before they perform their examinations. Their “method of testing is, in effect, an evidentiary show-up, not~~ ~~what scientists would regard as a blind test.”~~ *~~United States v. Taylor~~*~~, 633 F.Supp.2d 1170, 1178 (D.N.M. 2009)~~ ~~(citations and quotations omitted). No standard operating procedure exists to prohibit or limit the amount of~~ ~~contextual information an examiner has during the examination procedure. Recognizing the potential for bias and~~ ~~avoiding or compensating for it is an essential task in every scientific field, but it is particularly important in forensic~~ ~~practice.~~ *~~See~~* ~~NRC Forensic Science Report at 8 n. 8, 124 (“The findings of forensic science experts are vulnerable~~ to cognitive and contextual bias”). However, it is in these fields that are most at risk of bias effects that the least ~~efforts have been made to understand these “effects and methods for minimizing them.”~~ *~~Id.~~* ~~at 124. “Unfortunately~~, ~~at least to date, there is no good evidence to indicate that the forensic science community has made a sufficient effort~~ ~~to address the bias issue.”~~ *~~Id.~~* ~~at 8 and n.8~~.

specific known source).”[14](#_bookmark13) *Id.* at 87. Such claims have also recently been scrutinized and

**Commented [b13]:** I think the point made in this footnote is REALLY important to combat the “match” language.

disfavored by United States District Court Judges Paul W. Grimm (Magistrate) and William D. Quarles in the District of Maryland and Algenon L. Marbley in the Southern District of Ohio (following the release of the NRC Forensic Science Report), as well as Jed S. Rakoff in the United States District Court in the Southern District of New York (before the release of the report, and favorably cited therein). *See* Opinion and Order in *United States v. Tavon Mouzone*; *United States v. Willock* (adopting Judge Grimm’s order in *Mouzone*); *United States v. Anthody*

*D. Alls*; and *United States v. Chaz Glynn*, attached hereto as Exs. F, G, H and I. The kinds of “bold absolutes” favored by firearms examiners – claims “that a match can be made ‘to the exclusion of all other firearms in the world’” – “unrealistically impl[y] an error rate of zero.” NRC Ballistic Imaging at 67,; 82. [15](#_bookmark14) Without a “statistical framework that allows quantification

of these claims” and an estimation of the probability of a random match, ~~they~~ such absolutes are scientifically unacceptable. *See* NRC Forensic Science Report at 154, 189.[16](#_bookmark15)

14 Note that the NRC specifically finds “matching” and “individualization” to be equivalent terms.

15 The few existing “studies” claiming perfection from firearm examiners are without merit given the well-accepted fact among firearms examiners that false identifications are made. *See, e.g.,* Lowell Bradford, *Forensic Firearms Identification: Competence or Incompetence*, 11(2) AFTE J. (1979) (“An appalling number of misidentifications have been found in the firearm identifications field.”); Evan Hodge, *Guarding Against Error*, 20(3) AFTE J. 290 (1988) (Chief of the FBI Firearms-Toolmarks Unit: “Most of us know someone who has committed serious error”). These errors are not limited to small towns or inexperienced practitioners – a number of errors have been found in major metropolitan police firearms units. *See, e.g.,* Nick Bunkley, “Detroit Crime Lab Is Closed After Audit Finds Serious Errors in Many Cases” New York Times, Sept. 25, 2008, *available at* [http://www.nytimes.com/2008/09/26/us/26detroit.html?\_r=2&ei=5070&emc=eta1&oref=slogin&oref=slogin](http://www.nytimes.com/2008/09/26/us/26detroit.html?_r=2&amp;ei=5070&amp;emc=eta1&amp;oref=slogin&amp;oref=slogin) (reporting the shuttering of Detroit Police Department’s firearms examination unit after auditors found at least 19 instances of serious firearms identification errors in a random review of 200 cases); “Review of LAPD ballistics unit set after botched test in murder case; charges dropped against LA sheriff’s deputy,” Law Enforcement News, Vol. XV, No. 295, June 30, 1989.

16 Acknowledging the probabilistic nature of forensic “identity” claims, courts have incorporated this critical component into the rule governing the admissibility of DNA “match” evidence. *Porter*, 618 A.2d at 640 (holding that DNA evidence must be accompanied by a generally accepted statistic expression of the likelihood of a coincidental match). Now that FATM analysis is finally getting the attention from the scientific community that was granted years ago to forensic DNA analysis, the consensus is that firearms identification testimony should not be admitted in the absence of a generally accepted statistical expression or acknowledgement of the probability of a coincidental or random match. It is important to note that such a statistical framework is not an impossible task; in fact, as the NRC points out, “[r]ecent research has attempted to develop a statistical foundation for assessing the

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Nor does the scientific community accept that “reasonable degree of scientific certainty” and “practical certainty” can be used as ambiguous “fudge factors” to temper scientifically unsupported and impermissible absolute identity claims. It is actually *impossible* to draw a conclusion to any degree of certainty using a methodology that is unvalidated, because “certainty” necessarily implies that “[n]umerical data” has been collected during validation studies that would support a “range of plausible values.” NRC Forensic Science Report at 116; *see also Glynn,* 578 F.Supp.2d at 574 (finding that FATM “not only lacks the rigor of science but suffers from greater uncertainty than many other kinds of forensic evidence.”). There is no more

scientific support for the qualified opinion statements proposed here than there is for any other iteration of the claim proposing to link a bullet or cartridge casing with one particular barrel in all the world. As Judge Grimm found in applying the NRC Forensic Science Report to the FATM evidence presented to the court, “***there is no meaningful distinction between*** a firearms examiner saying that ***‘the likelihood of another firearm having fired these cartridges is so remote as to be considered a practical impossibility’*** and saying that his identification is ***‘an absolute certainty.’ Neither is justified*** [F]irearms and toolmark examiners must be

restricted in the degree of certainty with which they express their identification opinions.”

*Mouzone*, 2009 WL 3617748 (emphasis added).

\* \* \*

Given these critiques, there is no serious question that there is a debate in the relevant scientific community over the scientific limitations on the firearm and toolmark discipline. On one side of the divide stand independent scientists – experts in the scientific method, proper

likelihood that more than one tool could have made specific marks by assessing consecutive matching striae, but this approach is used in a minority of cases.” See NRC Forensic Science Report at 154 n. 63. For now, however, there is no scientific basis for statistical claims of matches to an absolute, “reasonable degree of scientific” or “practical” certainty.

experimental design, measurements of certainty, metal-to-metal interactions, and the manufacturing processes employed in firearm production – as well as forensic practitioners and heads of forensic laboratories. After reviewing the firearm and toolmark methodology and supporting literature, they found that the method has not been validated – that the reliability and accuracy of the method is unknown. They found that there is no basis in science for identifying a particular source without matching criteria or objective standards of any sort. Because the scientific research is so flawed and limited:

It is currently unknown how many other firearms might be expected to produce marks that would be considered “sufficient” for a match. Properly conducted validation studies might be able to provide these essential details; however, the studies supplied to the Committee as representative “validation studies” suffer from extensive flaws in design and do not serve this purpose.

Kennedy Affidavit (Exh. A), at para. 5. Due to these limitations on their methodology, these scientists and forensic practitioners say, firearms examiners have not demonstrated that they can reliably identify a particular firearm, nor what would be required to reliably identify a particular firearm.

On the other side stand forensic firearm examiners, beholden to the continued public trust in their discipline for their bread and butter. As Judge Edwards, co-Chair of the Committee that drafted the report, has pointed out, they have not “meaningfully refuted” the NRC’s findings regarding their discipline. *See* Exhibit 1 to Defendant’s May 12, 2010 Supplemental Memorandum (Harry T. Edwards, *The National Academy of Sciences Report on Forensic Sciences: What It Means for the Bench and Bar* at 3 (May 6, 2010) (“Edwards Statement”)).

Rather, they continue to assert that theirs is a reliable methodology because no one has proven that it is not, and that the only limitation on their discipline is a “practical” one, because “one

cannot rule out the theoretical, infinitesimal possibility” of a coincidental match. Clearly, the two sides are diametrically opposed.

The existence of a controversy in the relevant scientific community is the beginning and the end of the story in a *Frye* jurisdiction such as this one., *Ssee United States v. Jenkins*, 887

A.2d 1013, 1022 (D.C. 2005). As such, because there is a controversy as to whether a toolmark examiner can match a bullet or cartridge casing to a particular gun (or claim two bullets or casings were fired through the same gun), the examiner cannot testify to such a conclusion. As this Motion further explains, the conclusion language of “match or a practical certainty” or “to a reasonable degree of certainty in the field of firearm and toolmark identification” is too close to the impermissible identification conclusion that the NRC report and other scientists find unacceptable.

## The methodology behind “practical certainty” is not sufficient under D.C. law

In recent litigation, the government has asserted that “training and experience” in a pattern recognition can be considered a generally accepted methodology under *Frye/Dyas*. That is wrong. The third prong of the *Dyas* test “incorporates the so-called *Frye* test, under which scientific testimony is admissible only if the theory or methodology on which it is based has gained general acceptance in the relevant scientific community.” *Jones v. United States*, 990 A.2d 970, 977 (D.C. 2010) (citing *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923)).

As the NRC pointed out after extensive scrutiny of the firearm examination process, “the decision of the toolmark examiner [to declare a match] remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates”:

As noted above, AFTE has adopted a theory of identification, but it does not provide a specific protocol. It says that an examiner may offer an opinion that a specific tool or

firearm was the source of a specific set of toolmarks or a bullet striation pattern when “sufficient agreement” exists in the pattern of two sets of marks. It defines agreement as significant “when it exceeds the best agreement demonstrated between tool marks known to have been produced by different tools and is consistent with the agreement demonstrated by tool marks known to be produced by the same tool.” The meaning of “exceeds the best agreement” and “consistent with” are not specified, and the examiner is expected to draw on his or her own experience. This AFTE document, which is the best guidance available for the field of toolmark identification, ***does not even consider, let alone address***, questions regarding variability, reliability, repeatability, or the number of correlations needed to achieve a given degree of confidence.

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*Id.* at 153, 155 (emphasis added). The NRC report makes clear that firearms identification does

not follow a scientifically acceptable methodology ~~– at least not in the sense of what is generally~~

~~accepted as a methodology by scientists –~~ because it lacks a “precisely specified, and

scientifically justified, series of steps that lead to results with well-characterized confidence limits.” *Id.*

The government, in response to this argument, has never done more than recites the AFTE Theory of Identification’s ambiguous “sufficient agreement” hypothesis,[17](#_bookmark16) and note~~d~~ that

17 This “Theory of Identification” overcredits what firearms practitioners actually do during an examination. *See, e.g.*, Affidavit of John Nixon, attached as Exhibit D, at para. B6 (“Quoting from the AFTE Theory of Identification, Mr. Bunch attempts to give more weight to the “sufficient agreement” standard by claiming in paragraph 21 of his 28 May 2008 affidavit that “the relative height or depth, width, curvature and spatial relationship of the individual peaks, ridges and furrows within one set of surface contours are defined and compared to the corresponding features in the second set of surface contours.” This statement is simply incorrect, and impossible. The view through the comparison microscope yields a two dimensional image, so the height, depth, and curvature of any observed features cannot reliably be assessed, and certainly cannot be measured. The bench notes in this case demonstrate that these factors are not considered by the examiners. The bench notes provide a level of “definition” of observed features that is typical of firearms examiners. The caliber of the ammunition is defined, the overall shape of the firing pin (“R,” presumably meaning rectangular) is noted, “case body marks” are described as “P” (presumably “parallel”), and the positions of extractor and ejector marks are defined in terms of a clock face (3:00 and 7:00). No descriptions of the height, depth, or curvature of individual characteristics were recorded. In other words, the bench notes describe only *class characteristics*” (emphasis in original)); Affidavit of William Tobin, attached as Exhibit C, at para. 50 (“In my reviews of underlying benchnotes and/or worksheets of firearms/toolmarks examiners, I most frequently see no discussion or reference to subclass characteristics or ‘subclass carryover’ but, rather, observe a direct leap from class characteristics

firearms examiners have “training” and use the same microscopes they have used since the 1930s.[18](#_bookmark17)

**Commented [b14]:** Examiners may have “training” and experience – the defense does not aver that they do not. The fact remains that such training is founded on unscientific methodologies and examiners make unscientific conclusions.

Every declaration of certainty is by its nature probabalistic. Without information about variability, reliability, and repeatability, no declaration of certainty can be justified.

This is unacceptable under *Frye,* which requires that expert testimony be based on a generally accepted scientific method. No matter an expert’s conclusions, they are inadmissible under *Frye* unless they are derived from a scientific methodology that has been tested and validated by the relevant scientific community. “An expert’s ‘experience’ is not a substitute for the scientific method, which requires techniques more rigorous than just the accumulation of observations and intuitively plausible deductions.” *Jones*, 990 A.2d at 980. *See also United States v. Downing*, 753 F.2d 1224, 1237 n.14 (3d Cir. 1985) (“Implicit in the *Frye* approach . . . is the assumption that extensive testing of the technique will occur within the relevant scientific community.”); *Blackwell*, 971 A.2d at 583 (“To real scientists a finding of fact is only as good as the methods used to find it For scientists, the key word in the phrase ‘scientific method’ is

*method*. Methodology—the logic of research design, measures, and procedures—is the engine that generates knowledge that is scientific.”); *Brim v. State*, 695 So.2d 268, 272 (“[The *Frye*] standard requires a determination, by the judge, that the basic underlying principles of scientific evidence have been sufficiently tested and accepted by the relevant scientific community.”).

Even if, contrary to *Jones*, training and experience were a substitute for the scientific method,

to presumed ‘individual’ characteristics. For example, in the worksheets and report created in this case, I see no discussion or implicit indication as to how the examiner differentiated between subclass and individual characteristics. Consistent with virtually every other case I’ve reviewed with firearms/toolmarks benchnotes and testimony, this suggests an ‘all or nothing’ approach, where the examiner presumes that the fabrication process left no subclass characteristics whatsoever and that all the characteristics used for comparison are “individual” characteristics.”).

18 Examiners may have “training” and experience – the defense does not aver that they do not. The fact remains that such training is founded on unscientific methodologies and examiners make unscientific conclusions. Every declaration of certainty is by its nature probabalistic. Without information about variability, reliability, and repeatability, no declaration of certainty can be justified.

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that would not change the fact that whatever “methodology” is followed by firearms examiners is not generally accepted as reliable in the relevant scientific community.

\* \* \*

Firearms examinations involve the comparison of patterns under a microscope. When “sufficient agreement” in patterns is observed – an undefined and subjective standard that finds its only meaning in an individual examiner’s training and experience – the examiner makes the long leap from matching patterns to the conclusion that these patterns came from one particular firearm. It is this “leap of faith,”[19](#_bookmark18) without articulable standards, objective matching criteria, or

knowledge of frequencies of occurrence, that is the source of controversy in the scientific community.

The problem many scientists have with the firearm identification process is not the comparison of patterns of marks. Rather, it’s the comparison of patterns of marks

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***without standards***. It’s the interpretation of a corresponding pattern on two objects as a statement of identity, without any scientifically valid studies or estimates of how often such a pattern would be expected to appear in any given type of firearm.

Kennedy Affidavit (Exh. A) at para. 6 (emphasis added). *See also* Affidavit of Clifford

Spiegelman, attached as Exhibit B, at para. 17 (“No one would want medical drugs or devices to be approved for marketing without well-defined and articulated experiments that emulate actual use. Indeed, the FDA would never approve a drug that had been so minimally tested and with such vague standards that the prescribing information instructed physicians to prescribe whatever amount they felt was ‘sufficient’ without specifications for patient’s age, size, medical history and other medications. In order for their methodology to be generally accepted as reliable by the scientific community, the same standards must apply to forensic tests. Transparency rather than

19 *See* Affidavit of William Tobin, attached as Exhibit C, at para. 5.

indeterminate, inarticulated, and vague matching criteria is required by science and the scientific method.”).

While he was President of the American Academy of Forensic Sciences (AAFS), Kenneth Melson, a former prosecutor and now Director of the Bureau of Alcohol, Tobacco, Firearms and Explosives, wrote: “Method validation studies and new research must be ongoing even in the areas of traditional forensic science disciplines. Justice demands good science and we have an obligation to provide it. We can no longer expect the courts or public to accept the truth of our science merely because we say it is good. In order to maintain the integrity of both the science and the justice system, we must prove that it is so.” Edwards Statement, *supra*, at 1 (quoting Melson). This Court should heed this call, the call of the National Research Council, and the call of the scientific community:

There is no evident reason why rigorous, systematic research would be infeasible. However, some courts appear to be loath to insist on such research as a condition of admitting forensic science evidence in criminal cases, perhaps because to do so would likely demand more by way of validation than the disciplines can presently offer.

NRC Forensic Science Report at 109 (alterations and internal quotation marks omitted).

## The government’s language is not generally accepted as reliable in the scientific community

While admitting that absolute certainty would require examining every firearm ever produced, the government unabashedly proposes that its firearm examiner, should be permitted to identify that two separate bullets have been fired from a particular gun “to practical certainty” without even looking at any particular firearm. The government arrives at its proposed language not by considering what constitutes common ground among a consensus of scientists, but rather by ignoring every single scientist who has spoken on the subject, including the National

Research Council, and wholeheartedly crediting the say-so of firearms examiners. This is inappropriate.

The NRC was adamant that “[f]orensic science reports, and any courtroom testimony stemming from them, must include clear characterizations of the limitations of the analyses.” *NRC Forensic Science Report* at 186. For firearms examinations, “[s]cientists agree that the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates. This finding does not render firearm and toolmark evidence useless; however, it does pose limits on what an examination can tell us.” Kennedy Affidavit at para. 8 (quotations omitted); *see also NRC Forensic Science Report* at 153-

55. As the NRC found, the lack of a defined and validated methodology with specific matching criteria prevent a firearms examiner from identifying a particular gun as the source of marks on a piece of ammunition – to any degree of certainty – with demonstrable reliability. *Id.* at 7; 153-

55. *See also* Exhibits A-D (Affidavits of Donald Kennedy, Clifford Spiegelman, William Tobin and John Nixon).

Recent opinions have heeded the admonitions of the scientific community. For example, after an evidentiary hearing the court in *United States. v. St. Gerard* (U.S. Army Tr. Judiciary, 5th Judicial Cir. June 7, 2010), found that any firearms opinion must be limited because “the subjective nature of the process, lack of quantitative standards, and limited scope of foundational testing do not demonstrate the scientific principles necessary to establish the origin of the marks with ***any specific amount of certainty***.” *Id.* at 4 (emphasis added) (attached as Exhibit E1).

The judge clarified her ruling in a later hearing:

ATC: In a previous 39 Alpha, you stated, I believe, what I understood to be that Mrs. Sevigny could not discuss the level of certainty that there’s a match between the cartridge case and the firearm; but that she could at least

state that she found a match. Is that a correct understanding?

MJ: That is not. The court’s intent is to allow this witness to testify that the markings are consistent; that they’re similar; that-- However she wants to describe them; that she saw 40 striations that matched 40 other striations; that they could have come from this weapon; they’re consistent with what she sees. ***But for her to definitively say, “And I found that they came specifically from this weapon,” is expressly excluded*.**[20](#_bookmark19)

*United States v. St. Gerard*, Unofficial Tr. at 1178:9-21 (emphasis added) (attached as Exhibit E2). Other courts have held similarly*. See, e.g.*, *United States v. Mouzone*, Crim. No. WDQ-08- 086, *reprinted in and adopted by United States v. Willock*, 696 F.Supp.2d 536, 574 (D. Md.

2010) (recommending that the firearm examiner not be permitted to testify to a match to any degree of certainty, “whether ‘more likely than not’ or ‘to a reasonable degree of ballistic certainty’”); *United States v. Glynn*, 578 F. Supp. 2d 567, 568-69 (S.D.N.Y. 2008) (finding that there is no basis for firearms examiners to testify to “any degree of ‘certainty,’ whether ‘ballistic certainty’ or otherwise.”).

“In science, recognizing the limitations of our knowledge is as important as knowledge itself. Unfortunately, forensic practitioners do not recognize the limitations on their knowledge.” Kennedy Affidavit (Exh. A), at para. 8. The NRC concluded that the firearm identification

20 As the *St. Gerard* court points out, where it is not permissible to admit a “match” to a particular firearm to any degree of certainty, it is not permissible to admit a “match” at all. The NRC stated plainly in a previous report, “[t]o say that two patterns match, without providing any scientifically valid estimate (or, at least, an upper bound) of the frequency with which such matches might occur by chance, is ***meaningless***.” Nat’l Research Council, Nat’l Acad. of Science, *DNA Technology in Forensic Science*, 74 (1992) (emphasis added). Courts have recognized in other forensic contexts that “[o]nce the observation has been made that there is a match between the known (i.e., suspect’s) and questioned (i.e., crime scene) samples, ***the significance of that determination must be ascertained and expressed to the jury***.” *United States v. Yee*, 134 F.R.D. 161, 180 (N.D. 1991) (emphasis added); *see also Porter*, 618 A.2d at 640 (“We would not permit the admission of test results showing a DNA match (a positive result) without telling the jury anything about the likelihood of that match occurring.”) (citation, quotation, and modification omitted).

process (and any conclusions that flow from it) does not adhere to the scientific method, and has not been shown to be reliable. *See, e.g.,* NRC Forensic Science Report at 154 (“Sufficient studies have not been done to understand the reliability and repeatability of methods.”). The validity of the field’s underlying assumptions has not been demonstrated. *Id.* “A significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to quantitatively characterize the probability of uniqueness.” *Id.*

In other words, firearm examiners have not come close to characterizing the chance of a coincidental match. The government proposes that despite this, its expert be permitted to testify not only to a match to a particular firearm, but a match to a particular firearm to a “practical certainty,” and to a “reasonable degree of certainty” which communicate a “high level of certainty” – *as expressly rejected by the NRC*. *Compare* Gov’t. Opp. at 30-31 (quoting Bunch Decl); Rule 16 Notice at 5 *to* NRC Forensic Science Report at 7 (finding that no pattern matching discipline, including firearms, “has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source”); *id.* at 153-55. Neither of these formulations is generally accepted ~~as~~ by the relevant scientific community:

I have been told that firearm and toolmark examiners currently propose that they can “match” to a particular firearm “to a reasonable degree of scientific certainty” or “to a practical certainty.” Both of these formulations are directly contrary to the findings of the Committee, which have been widely endorsed by scientists both within and outside the National Research Council and National Academy of Sciences. The Committee was quite clear that the firearms and toolmark discipline has not established that its practitioners can reliably match patterns of markings to a particular firearm to any degree of certainty, much less the high degrees of certainty communicated by these two formulations.

Kennedy Affidavit at para. 8;

An identity statement to any degree of certainty implies a statistical basis that the scientific community agrees simply does not exist. “Conclusions drawn in firearms

identification should not be made to imply the presence of a firm statistical basis when none has been demonstrated.” Ballistic Imaging at 82. Not only are “absolute certainty” statements inappropriate, but the language that the prosecutor suggests – “reasonable scientific certainty” or “practical certainty,” both of which communicate a very high level of confidence (just short of absolute) in the result – are equally unsupported by science and unwarranted given the available data.

Spiegelman Affidavit (Exhibit B) at para. 19; and

[A]ssertions of “to the exclusion of all others,” “no other weapon in the world”, “unique signature”, “reasonable scientific certainty,” “practical certainty,” “near-zero error rate,” “infallible methodology” and “were fired from [a particular] gun,” inherently imply a statistical basis (and a high degree of certainty) that scientists do not accept and do not believe has been established.

Tobin Affidavit at para. 67; *see also* para. 5.

### *Reasonable degree of certainty in the field of firearms and toolmark identification*

As the defense has shown, there is *nothing* scientific about firearms examiners’ certainty.

In addition to the obvious discord of this language with the findings of the NRC Report, even some forensic practitioners refuse to accept that firearms can match markings to a particular firearm to a “reasonable degree of certainty.” Alfred Biasotti, one of the leading proponents of the firearm and toolmark discipline, stated back in 1964 that when firearms and toolmark examiners follow the traditional, subjective pattern matching approach, they implicitly admit that “we lack necessary statistical data which would permit us to formulate precise criteria for distinguishing between identity and nonidentity with a reasonable degree of certainty.” *The Principles of Evidence Evaluation as Applied to Firearms and Tool Mark Identification*, 9 J. For. Sci., 428, 430 (1964). Christophe Champod and I.W. Evett – both professors of forensic science and forensic practitioners with specialties in statistical issues related to identification evidence – have explicitly eschewed similar language, stating:

[T]he FBI appears to be promoting the view that a scientist may set a criterion for “certainty” – they suggest the phrase “reasonable degree of scientific certainty.” The use of the word “scientific” in this context implies an objectivity that is entirely illusory – scientific certainty is no different from any other kind of certainty.

Champod & Evett, 51 J. Forensic Identification at 111.

Legal scholars are even more adamant. Edward J. Imwinkelried, co-author of SCIENTIFIC EVIDENCE,[21](#_bookmark20) has stated that:

In the vast majority of cases in which the expert relies on inductive reasoning, the trial judge ought to forbid the expert from employing the noun “certainty” or the adverb “certainly.” [22](#_bookmark22)

The language has likewise been rejected by the co-editor of MODERN SCIENTIFIC EVIDENCE.[23](#_bookmark21) In a recent article in Forensic Science International, Michael J. Saks advised: “What can forensic scientists do while waiting for a serious body of research to evolve that illuminates their particular subfield? Abandon the use of misleading terminology, such as ‘match’ or

‘identification’ or ‘scientific certainty.” Saks, *Forensic identification: From a faith-based “Science” to a scientific science*, For. Sci. Int’l. (2010).

Courts, both within this jurisdiction and without, have rejected this language. *See, e.g., Mouzone*, *reprinted in and adopted by Willock*, 696 F.Supp.2d at 574; *United States v. Glynn*, 578 F. Supp. 2d at 568-70 (“Valenti could not testify that ballistics was a ‘science,’ nor could he claim that he reached his conclusions to any degree of ‘certainty,’ whether ‘ballistic certainty’ or

21 This treatise has been relied on as an authority on scientific evidence by both the U.S. Supreme Court and the D.C. Court of Appeals. *See, e.g., Melendez-Diaz v. Mass*., 129 S.Ct. 2527, 2537 (2009); *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 585 n.3, 586 n.4,

587 n.5 (1993); *Jarrett v. Woodward Bros., Inc*., 751 A.2d 972, 976 n.4 (D.C. 2000).

22 Imwinkelried, Edward J., “Reassessing How Experts Vouch for Opinions; Phrase ‘to a Reasonable Degree of Scientific Certainty’ Can Be Inaccurate, Misleading and Confusing.” 32 *National Law Journal* 8 (March 15, 2010

23 This treatise has similarly been relied upon as an authority on scientific evidence. *See, e.g., United States v. Scheffer*, 523 U.S. 303, 309 (1998); *Jones v. United States*, 990 A.2d 970, 980

n.32 (D.C. 2010).

otherwise”); *United States v. Taylor*, 663 F. Supp. 2d at 1180 (“because of the limitations on the reliability of firearms identification evidence discussed above, Mr. Nichols will not be permitted to testify that his methodology allows him to reach this conclusion as a matter of scientific certainty”); *United States v. Montiero*, 407 F. Supp. 2d 351, 372 (“there is no reliable statistical

or scientific methodology which will currently permit the expert to testify that it is a “match” to an absolute certainty, or to an arbitrary degree of statistical certainty.”). This Court should

similarly reject the government’s proposal.

The adjective “reasonable” has no meaning when an examiner testifies that his conclusion has a “reasonable degree of certainty in the field of firearms and toolmarks identification.” As discussed *supra*, every declaration of certainty is by its nature probabalistic. Without information about variability, reliability, and repeatability, no declaration of certainty

**Commented [b15]:** Wow, we do a really great job here of demolishing the “scientific certainty” formulation and variations thereof,but the title of this section is “reasonable degree of certainty in the field of firearms and toolmarks identification.” Nothing about science there.

From one perspective it is “reasonable” in the field of FATM identification, but what is reasonable there is unreasonable to scientists, because the field is bullshit. I think we should keep most of what we have (or all of it), but include something to combat this idea.

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can be justified. Only validation studies exploring error rates would allow us to conclude what a

“reasonable degree of certainty” is, but no reliable studies exist. The phrase “reasonable degree

**Commented [b16]:** Not sure if absolutely none exist or if some but an insufficient number exist.

of certainty” simply evades the scientific community’s central criticism.

Unquestionably, high levels of certainty are consistently asserted by firearms examiners.

But consistency does not equal reasonableness. Whether such certainty is “reasonable” within

the field of firearms and toolmarks identification is irrelevant because the relevant scientific

community has found that no level of certainty is justified in the field.

### *Practical certainty*

Practical certainty connotes an even higher level of certainty than does “reasonable

scientific certainty,” and as such is even more antithetical to generally accepted views of the state

**Commented [b17]:** Same complaint as above

of the science in the firearm and toolmark discipline. Practical certainty implies that it would be

practically impossible to be more certain. However, with the validation studies, standardization, and scientific methodologies that the relevant scientific community calls for, it would be easy to be more certain.

In common usage, “practical certainty” is synonymous with “virtual certainty,” “effective certainty” and “near certainty,” with certainty in each of these iterations being absolute. *See* Oxford Paperback Dictionary and Thesaurus at 714 (2009). In other words, the commonly understood meaning of “practical certainty” is certainty verging on absolute. The legal definition of “practical certainty” follows very similar lines of thought. In *Ingram v. U.S.*, 592 A.2d 992, 1002 (D.C. 1991), the Court of Appeals described a probability scale on which practical certainty falls:

[F]or example, all acts with a substantial probability of occurrence (e.g., one chance in five); acts that are more probable than not to occur; acts of very high probability (e.g., 90%); and acts so likely that their occurrence is a practical certainty. Given the imperfection of human knowledge, the latter is the equivalent of knowledge; an accomplice ‘knows’ an act will happen if he is ‘practically certain’ it will.

*Id.* Like its common usage counterpart, “practical certainty” in the legal context “is the equivalent of knowledge,” or absolute certainty. *See also* Model Penal Code § 2.02 at 236 n. 13 (1985) (“With respect to result elements, one cannot of course ‘know’ infallibly that a certain result will follow from engaging in conduct, and thus to some extent ‘knowledge,’ when applied to result elements, includes a contingency factor as well. This is expressed definitionally in terms of whether the actor is ‘practically certain’ that the result will follow.”).

“Practical certainty” is completely inappropriate in light of generally understood limitations on the firearm and toolmark discipline, with or without the embellishments that firearms examiners and the government tack onto its inherent meaning. The government has proposed that “[p]ractical certainty means that the determination of the identity correlates to

features who [sic] frequency (or likelihood) of reoccurrence by another tool is so remote that it can be considered a practical impossibility.” The Association of Firearms and Toolmark Examiners (AFTE) works similar language into its “Theory of Identification”: “The statement that ‘sufficient agreement’ exists between two toolmarks means that the agreement is of quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.” Worded differently, but similar in meaning, is the FBI Scientific Working Group for Firearms and Toolmarks (SWGGUN)’s definition of “practical certainty”: “In the context of a scientific conclusion, practical certainty occurs when . . . he or she acknowledges that, in the abstract, it is not possible to achieve absolute certainty for results flowing from a scientific theory or technique.” SWGGUN Glossary at 4.

The term practical certainty communicates the idea that one has done all but rule out the theoretical, infinitesimal possibility that the toolmarks identified as having been made by a particular firearm could have been produced by another firearm. As both scientists and courts have pointed out, this is a distinction from “absolute certainty” without substance: “there is no meaningful distinction between saying that ‘the likelihood of another firearm having fired these cartridges is so remote as to be considered a practical impossibility’ and saying that his identification is ‘an absolute certainty.’” *Willock*, 696 F. Supp. 2d at 572-73. *See also United States v. St. Gerard* (Exhibit E1), at 4 (granting “the defense motion to exclude the testimony of Mrs. Sevigny that it would be a practical impossibility for the cartridge case to have been fired by any other weapon”); *United States v. Taylor*, 663 F. Supp. 2d at 1180 (“Mr. Nichols also will not be allowed to testify that he can conclude that there is a match to the exclusion, either practical or absolute, of all other guns.”). *See also* Exhibits A-D (Kennedy, Spiegelman, Tobin and Nixon affidavits).

When people speak in terms of practical certainties, they speak of things that have been rigorously tested just short of the point of absolute confirmation, leaving only an “abstract” or “theoretical” possibility of occurrence, such as, it is a practical certainty that gravity will not reverse itself tomorrow, leaving me to tumble off the face of the Earth. Practical certainty is the allowance for “anything is possible,” (wink, wink).

A statement of identity to a “practical certainty” is inconsistent with the findings of the

NRC, that the lack of a defined and validated methodology with specific matching criteria

prevents a firearms examiner from identifying a particular gun as the source of marks on a piece

of ammunition – to any degree of certainty – with demonstrable reliability. *See* NRC Forensic Science Report at 7; 153-55. *See also* Exhibits A-D (Affidavits).

## The defense proposed language is appropriate, accurate and generally accepted

The defense has never suggested that admission of firearms testimony is an all or nothing proposition. The NRC report acknowledges that, “although some techniques may be too imprecise to permit accurate identification of a specific individual, they may still provide useful and accurate information about questions of classification.” NRC Forensic Science Report at 8. With respect to firearms identification in particular, the NRC report notes that, while firearms examiners have not demonstrated that they can reliably conclude that a piece of ammunition was fired from a certain *individual* firearm, firearms examiners may have a valid basis for concluding that the ammunition was fired from a certain *class* of firearms. *Id.* at 154 (“Because not enough is known about the variabilities among individual tools and guns, we are not able to specify how many points of similarity are necessary for a given level of confidence in the result The

committee agrees that class characteristics are helpful in narrowing the pool of tools that may have left a distinctive mark.”).

Legal scholars have discussed how the generally accepted state of this pattern matching discipline might be translated into accurate and appropriate courtroom testimony. Michael Saks, co-editor of MODERN SCIENTIFIC EVIDENCE, along with Jonathan Koehler, a law school professor who holds a doctorate in Research Methodology, have suggested that examiners be honest about the limitations on defining the “the pool of tools that may have left a distinctive mark,” NRC Forensic Science Report at 154:

Examiners could explain that, in finding that two patterns match, they have placed the suspect object or person in a pool of one or more objects that match the evidentiary marks. The strength of the likelihood that the known object or person shares a common source with the questioned object or person depends upon the size of the pool. No scientific justification exists for assuming that the size of the pool is 1. And, for most areas of criminalistics (other than DNA…), there are no empirically grounded estimates of how large such pools might be. Experts should not substitute their intuition or judgment in an effort to fill these knowledge gaps. The speculation of an examiner about the size of those pools is not scientific evidence. It is, simply, speculation.

Michael J. Saks and Jonathan J. Koehler, “The Individualization Fallacy in Forensic Science Evidence”, 6(1) Vanderbilt L. Rev. at 4.

Applied to the current state of the firearm and toolmark discipline, the smallest pool that scientific studies currently support is those firearms that share class-based characteristics:

A scientifically acceptable reporting, at this stage of firearms/toolmarks practice development, would be similar to that adopted by The Centre of Forensic Sciences in ending use of the term ‘match’ in reporting DNA results and testimonies: that ‘source A’ cannot be excluded as the source of a particular fired bullet or cartridge case. This is both accurate and, unlike a word like “match,” does not have inherent meaning that is at odds with its evidentiary value. Further, “cannot exclude” can be scaled up and down based on efforts by the individual examiner, and by advances in the field. For example, right now it is generally accepted that firearms examiners can narrow the “pool of tools” that cannot be excluded down to those that share class characteristics (e.g. direction of twist and number of rifling grooves).

Tobin Affidavit (Exh. C) at para. 42. [24](#_bookmark24) *See also* Kennedy Affidavit (Exh. A) at para. 8;

Spiegelman Affidavit (Exh. B) at paras. 19-20. ~~As Mr. Tobin notes, “unlike a word like~~

~~‘match,’” “cannot exclude” is accurate without “hav[ing] inherent meaning that is at odds with~~

~~its evidentiary value.”~~ *~~Id.~~* ~~“Further, ‘cannot exclude’ can be scaled up and down based on~~ ~~efforts by the individual examiner, and by advances in the field.”~~ *~~Id.~~*[25](#_bookmark23) Not only does~~is~~ this

language accurately ~~and~~ reflects the generally accepted state of the firearms comparison

discipline, it also encourages firearm examiners to take it upon themselves to make their examinations more scientific.[26](#_bookmark25)

24 For example, while studies currently support no more than “cannot exclude based on class characteristics,” a firearms examiner might be able, through his own individual efforts, to limit the pool down to a particular make and model of firearm, if he were to study the manufacturing techniques used to produce that make and model and examine other firearms of that make and model to familiarize himself with their distinctive characteristics. This would allow him to articulate how be brought the pool down to a smaller size, something that is not currently done.

25 ~~For example, while studies currently support no more than “cannot exclude based on class~~ ~~characteristics,” a firearms examiner might be able, through his own individual efforts, to limit~~ ~~the pool down to a particular make and model of firearm, if he were to study the manufacturing~~ ~~techniques used to produce that make and model and examine other firearms of that make and~~ ~~model to familiarize himself with their distinctive characteristics. This would allow him to~~ ~~articulate how be brought the pool down to a smaller size, something that is not currently done.~~

26 John Nixon, who is both a firearms examiner and an engineer, describes the current state of firearms examinations:

In paragraph 25 of his 28 May 2010 Statement, Mr. Bunch states that “In making an identification, an examiner utilizes sound examination methods by employing the precepts of empirical research or study in the comparison of two toolmarks.” This could not be further from the truth, and it demonstrates a basic lack of understanding of what constitutes scientific research. If firearms examiners were “employing precepts of empirical research,” they would follow validated protocols and have objective criteria for assessing potential “matches.” They would examine more than one firearm before identifying a firearm as the source of marks on bullets/cartridge cases – not only because there would be no other way for them to put the markings they viewed in proper context (class/sub-class/individual), but also because this at least minimally limits bias, one of the biggest concerns of scientific study. As currently practiced, and as described by the NRC, firearms examinations are conducted in a way that is decidedly unscientific and fraught with potential bias. This puts limitations on what conclusions firearm examiners can reliably draw based upon their observations.

Not only does “cannot exclude” reflect the consensus opinion of the relevant scientific community (which is sufficient under *Frye*), further, the language is embraced by forensic practitioners as an accurate and appropriate substitute for “match,” which is misleading.[27](#_bookmark26) Even in DNA analysis, the only forensic discipline that “has been rigorously shown to have the

capacity to consistently, and with a high degree of certainty, demonstrate a connection between an evidentiary sample and a specific individual or source,”[28](#_bookmark27) some analysts limit their testimony

Nixon Affidavit (Exh. D), at para. B12.

27 For example, a recent FBI Laboratory article published in the Journal of Forensic Science regarding the “semantics” of forensic conclusions addresses “the need to properly convey evidentiary weight.” Bruce Budowle et al., *A Perspective on Errors, Bias, and Interpretation in the Forensic Sciences and Direction for Continuing Advancement*, J. of Forensic Sciences, Vol. 54, Issue 4, 798-809 (2009). The article was co-authored by a number of FBI analysts, including Stephen Bunch, former Chief of the FBI Firearms Unit and affiant for the government in this case.

Mr. Bunch and his FBI co-authors were explicit that an examiner’s testimony should clearly communicate the limitations of the analysis. *Id*. at 804. Indeed, the FBI publication concludes that: “in lieu of a quantitative approach, it is imperative that the weight of the evidence be explained qualitatively ***so that fact finders or other scientists can appreciate the limitations of the analysis and comparison***.” *Id*. at 804 (emphasis added). Specifically, the FBI authors concluded that:

[W]hen terms such as “association” or “match” are used in a qualitative statement they may convey to some people stronger significance than other terms such as “failure to exclude.” Others may find the current terminology reasonable and acceptable.

Because there may be an unintended contribution to bias (***i.e., conveying more strength than intended***) existing terminology should be reviewed for best practices in report writing. Regardless, as suggested above, when such terms are used they should be fully described in the case report so that the meaning of the terms, such as “association” or “match,” are understood in context. ***An alternative approach is to use instead the term “failure to exclude,” which may seem to some more acceptable***.

*Id*. at 804 (emphasis added); *see also id*. at 798 (“Forensic methods typically identify relevant features, make comparisons, and exclude or ***fail to exclude***.”). The article notes that, consistent with the state of the fierarms and toolmark discipline, “[t]he identification and comparison of features and the resulting interpretation of exclusion, ***failure to exclude***, or inconclusive can be made without quantification.” *Id*. at 804 (emphasis added).

28 NRC Forensic Science Report at 100. As the NRC report points out, however, “this does not mean that DNA evidence is always unassailable in the courtroom,” as “[t]here may be problems in a particular case with how the DNA was collected, examined in the laboratory, or interpreted,

to “cannot exclude” to avoid improper inferences.[29](#_bookmark28) Even those laboratories that will attribute DNA to a particular person will only do so when the chance of a coincidental match is less likely than 1 in 6 trillion; otherwise, “cannot exclude” is considered appropriate language. *See, e.g.,* 208 Interpretation Protocol, FBI DNAUI STR Protocol Manual at 29, 48. Given “cannot exclude” is considered accurate and appropriate language to characterize a DNA “match” where the probability that someone else would have the same DNA attributes is only 1 in 5.99 trillion, it is a more than generous representation of the probative value of a firearms “match,” where the probability of a coincidental match is unknown.[30](#_bookmark29) *See* NRC Forensic Science Report at 154 (“A significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to quantitatively characterize the probability of uniqueness.”).

Courts have agreed that, due to the limitations on firearm and toolmark comparison described in the NRC report – “the subjective nature of the process, lack of quantitative

such as when there are mixed samples, limited amounts of DNA, or biases due to the statistical interpretation of data from partial profiles.” *Id.* at 100.

Although the “goal is not to hold other disciplines to DNA’s high standards in all respects,” as “it is unlikely that most other current forensic methods will ever produce evidence as discriminating as DNA,” “the least that the courts should insist upon from any forensic discipline is certainty that practitioners in the field adhere to enforceable standards, ensuring that any and all scientific testimony or evidence admitted is not only relevant, but reliable.” *Id*. at 101. Certainly, less discriminating disciplines such as firearm and toolmark comparison should not be permitted to testify in a fashion that implies they have same or more scientific support than DNA analysis.

29 For example, a Canadian crime laboratory limits its characterizations to “cannot exclude” in all cases, no matter how vanishingly small the chance of a coincidental match. *See* Memorandum from R.J. Prime, Director of The Centre of Forensic Sciences for the province of Ontario to Crown attorneys for the province, cited by Koehler, J.J., Saks, M.J., “Individualization Claims in Forensic Science: Still Unwarranted,” 7(4) Brooklyn LR (2010) (“the term ‘match’ will no longer be used in the conclusions of CFS DNA reports, in an effort to more clearly link the conclusion drawn from an analysis to its purpose”).

30 Other forensic disciplines, such as hair and fiber analysis, also limit their conclusions to “cannot exclude” or similar language.

standards, and limited scope of foundational testing,” *United States v. St. Gerard* (Exhibit E1), at 4 – it is more appropriate for a firearms examiner to testify that markings on a bullet or cartridge case “could have come from this weapon” rather than “that they came specifically from this weapon.” *United States v. St. Gerard* (Exhibit E2) at 1178. Stating that markings on a cartridge case “could have come from this weapon” is synonymous with “this weapon cannot be excluded” as the source of markings on a cartridge case. As the *St. Gerard* court noted, any more than this is inconsistent with the state of the science. *Id.* (“for her to definitively say, ‘And I found that they came specifically from this weapon,’ is expressly excluded”).

**The *Anderson* opinion**

In an opinion handed down recently, the Court recognized that it was appropriate to apply the *Frye/Dyas* test for general acceptance to firearm and toolmark identification testimony in light of the NRC Report. *United States v. Anderson*, Order, at 18. Thus, the Court properly accepted that the authors of the NRC report are part of the relevant scientific community. *See id.*[*31*](#_bookmark30)The Court found that firearm and toolmark methodology is only quasi-scientific, *id.* at 21, and prevented the government’s expert from testifying that a particular firearm was the source of marks on ammunition, to a “reasonable degree of scientific certainty” or to a “practical certainty” as defined by the government, *i.e.*, “the likelihood of another firearm having fired these cartridges is so remote as to be considered a practical impossibility.” *Id.* at 32, 35. However,

31 Certainly the NRC contains individuals “whose scientific background and training are sufficient to allow them to comprehend and understand the process and form a judgment about it . . . changes the scientific landscape considerably and demonstrates indisputably that there is no general acceptance of the current process.” *United States v. Porter*, 618 A.2d 629, 634, 639 n. 17 (D.C. 1992) (quotations and citations omitted).

beyond these findings, the Court made a number of legal and factual errors that are discussed below.

### *The Court improperly took on the scientific community’s role in its legal analysis*

The Court did not bar identification opinions altogether. In fact, it permitted the examiner to testify to a high degree of certainty.[3](#_bookmark31)2

The Court based this on her own independent

**Commented [b18]:** Should we remind the reader in this footnote exactly what Leibovitz’s take on “practical certainty” was?

analysis of the scientific validity of the firearms comparison methodology and the so-called validation studies that purportedly support that methodology. Pursuant to *Frye,* she should have relied upon the consensus of experts in the relevant scientific community.

For example, the Court found that “[s]tudies involving consecutively manufactured firearms [which forensic firearm examiners deem “validation studies,” see Gov’t Opp. at 18] are particularly persuasive,” *Anderson* Order at 22, despite the fact that the NRC found that “the scientific knowledge base for toolmark and firearms analysis is fairly limited. [The studies]

suggest a heavy reliance on the subjective findings of examiners rather than on the rigorous quantification and analysis of sources of variability.” NRC Forensic Science Report at 155. *See also* Kennedy Affidavit (Exh. A), at para. 5 (“the studies supplied to the Committee as representative ‘validation studies’ suffer from extensive flaws in design”); Spiegelman Affidavit (Exh. B) at 21 (“these are not validation studies at all, but rather proficiency tests: the studies do not make any attempt whatsoever to characterize the matching criteria across the spectrum of firearms and manufacturing techniques, much less under conditions that would be encountered in casework. The results cannot be reliably extrapolated to other firearms or manufacturing

techniques, nor can they be reliably extrapolated to damaged ammunition”).

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32 Moreover, Judge Liebovitz’s analysis of the meaning of “practical certainty” is incorrect. See the discussion of “Practical Certainty,” *supra*.

The Court was “satisfied that the principles of uniqueness and reproducibility have been demonstrated and validated sufficiently,” *Anderson* Order at 26, despite the fact that the NRC found that “The validity of the fundamental assumptions of uniqueness and reproducibility of firearms-related toolmarks has not yet been fully demonstrated. A significant amount of

research would be needed to scientifically determine the degree to which firearms-related

toolmarks are unique or even to quantitatively characterize the probability of uniqueness.” NRC

**Commented [b19]:** I think a judge is going to jump on the fact that Leibowitz used “sufficiently” demonstrated and the NRC uses “fully” demonstrated. I guess the question is sufficiently for what? Certainly not “sufficient” to allow a FATM examiner to say “practical certainty.”

Forensic Science Report at 154 (quotations omitted). *See also United States v. Willock,* 696 F.Supp.2d 536 (stating that the NRC “made clear [that] despite the many studies conducted by toolmark examiners” the basic premises of uniqueness and reproducibility had not been scientifically established and major research was needed).

While the NRC found that “[T]he decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates A fundamental problem with toolmark and firearms analysis is the lack of a precisely

defined process This AFTE document, which is the best guidance available for the field of

toolmark identification, does not even consider, let alone address, questions regarding variability, reliability, repeatability, or the number of correlations needed to achieve a given degree of confidence,” NRC Forensic Science Report at 153, 155; the court found that “AFTE has adopted requirements – and the practitioners in the field have adopted and standardized these practices – that lend greater reliability and consistency to findings of firearms examiners,” *Anderson* Order

at 26.

Ultimately, the court ruled that “a firearms examiner should not be limited to stating an

**Commented [b20]:** These paragraphs, where you pull quotes from each, are very powerful. If there’s any others that we have we should consider popping them in (and I can look for myself if I can find Leibowitz’s report – I thought I had a copy somewhere…).

identification as ‘more likely than not.’ This, the Court concludes, sharply understates the

reliability of the opinion, given the level of reliability that has been demonstrated to underpin the

AFTE methodology itself,” *Anderson* Order at 33. The NRC, however, very clearly stated that “Because not enough is known about the variabilities among individual tools and guns, we are not able to specify how many points of similarity are necessary for a given level of confidence in the result. Sufficient studies have not been done to understand the reliability and repeatability of the methods.” NRC Forensic Science Report at 154.

In entering into scientific analysis itself, the court abused its discretion. “[T]he court may not resolve a scientific dispute between opponents and proponents of the technique, [and] the very existence of the dispute precludes admission of the testimony.” *Porter*, 618 A.2d at 634.

Because judges lack the expertise to assess the validity and reliability of a scientific technique, *Frye* limits their inquiry to whether *scientists* generally accept the technique as valid and reliable. *Jones v. United States*, 548 A.2d 35, 39 (D.C. 1988) (“The requirement of general acceptance in the scientific community assures that those most qualified to assess the general validity of a scientific method will have the determinative voice.” (quoting *United States v. Addison*, 498 F.2d 741, 743-44 (D.C. Cir. 1974)); *Porter*, 618 A.2d at 634 (“The consensus that will satisfy *Frye* ‘is that of scientists, not courts,’ for ‘[a] courtroom is not a research laboratory.’” (citation omitted)). In other words, the *Frye* test asks whether the expert testimony is based on a valid and reliable science,[33](#_bookmark32) but it requires judges to look to scientists to answer that question.

33 “The strength . . . of a scientific theory is measured, in part, by its validity, which is ‘the extent to which something measures what it purports to measure.’ . . . The second variable affecting the strength of a scientific theory is its reliability, which has been defined as . . . the ability of a measure to produce the same result each time it is applied to the same thing. Both

validity and reliability, then, affect whether a scientific theory is accepted in the field in which it is offered.” *Blackwell*, 971 A.2d at 240-41 (quoting 1 David L. Faigman et al., *Modern Scientific Evidence: The Law & Science of Expert Testimony* 269 (2008)).

### *The Anderson Court erred factually in its interpretation of the NRC report*

In *Anderson,* the Court also made a number of mistakes of fact in interpreting the NRC’s report. For example, on page 25 of its order, the court points out that “The NRC ultimately recognized that . . . ‘one can find similar marks on bullets and cartridge cases from the same gun.’ Thus the NRC did not, as defendants suggest, ‘squarely reject’ firearms examiners’

assertion that they can declare a match.” Actually, the quote taken from the NRC report simply says that one can find similar marks on bullets fired from the *same* firearm. It does not speak to whether one might find similar marks on bullets from *different* firearms. Indeed, the NRC actually said the opposite of what the court found: “A significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to quantitatively characterize the probability of uniqueness.” NRC Forensic Science Report at 154. Thus, the passage quoted by the court does not contradict the defendants’ suggestion “that the NRC ‘squarely reject[ed] firearms examiners’ assertion that they can declare a match.”

On page 28 of its order, the Court notes that “‘the standards and criteria for traditional pattern matching are subjective,’ but ‘it is the subjective judgment of trained professionals with a keen practiced eye for discerning the extent of matching patterns’” – to support its conclusion that “NRC Report itself, acknowledge[s] the reliability of the AFTE methodology.” However, the NRC expressly said this was not the case. *See, e.g.,* p. 154 (“The validity of the fundamental assumptions of uniqueness and reproducibility of firearms-related toolmarks has not yet been fully demonstrated. Because not enough is known about the variabilities among individual

tools and guns, we are not able to specify how many points of similarity are necessary for a given level of confidence in the result. Sufficient studies have not been done to understand the reliability and repeatability of the methods.”). Pointing out that firearms examiners are “trained

**Commented [b21]:** Do we know which page she pulled this quote from… I’m browsing through the FATM analysis section in chapter five and I don’t see it.

**Commented [b22]:** This needs to be clearer – so the problem is not her first sentence (which repeats what you have here – similar marks on bullets from the same gun), but her second sentence – declaring a match.

I think what you’re saying is that FATM examiners are committing a base rate fallacy. You can say that similar marks are found on bullets from the same gun, but that has no meaning as to whether a “match” can be declared without knowledge of how similar marks are for bullets fired from different guns.

professionals with a keen practiced eye” does not equate to an endorsement of the reliability of

their source attributions. Without population studies, it is irrelevant how keen the examiner’s

**Commented [b23]:** Right. This gets back to the “trained in what”. Without population studies, it is irrelevant how keen the examiner’s eye is because they have no basis on which to judge the uniqueness of the characteristics they are seeing. If anecdotal experience was sufficient to validate scientific and statistical claims, then there would be no need for the scientific method to exist.

Anecdotal, experiential evidence may be valuable, but it is exactly the kind of non-scientific validation/methodlogy that the NRC report expressly rejects. (CITE some quote or whatever here.)

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seeing. If anecdotal experience was sufficient to validate scientific and statistical claims, then

there would be no need for the scientific method to exist. Anecdotal, experiential evidence may

be valuable, but it is exactly the kind of non-scientific validation/methodlogy that the NRC

report expressly rejects. *See supra Jones.*

## CONCLUSION

The NRC report bemoans the fact that, despite the paucity of scientific research supporting the validity and reliability of pattern-matching forensic evidence, courts are reluctant to exclude or limit such evidence because of its lengthy historical pedigree and its prevalence in criminal investigation. NRC Forensic Science Report at 110 (“The principal difficulty, it appears, is that many [forensic science] techniques have been relied on for so long that courts might be reluctant to rethink the trial process In many forensic areas, effectively no research

exists to support the practice.” (alteration and omission in original) (quoting 1 Faigman et al., *supra*, § 1:1, at 5, 9); *id.* at 109 (“There is no evident reason why rigorous, systematic research would be infeasible. However, some courts appear to be loath to insist on such research as a condition of admitting forensic science evidence in criminal cases, perhaps because to do so would likely demand more by way of validation than the disciplines can presently offer.” (alterations and internal quotation marks omitted)). As the NRC report warns, if courts continue to ignore the lack of true science in the forensic sciences, they risk not only false convictions of innocent defendants, but the loss of public confidence in the criminal justice system. NRC Forensic Science Report at 4, 12. Indeed, recent DNA exonerations of defendants who were

convicted based on forensic science evidence—including in the District of Columbia—illustrate the high price of admitting “scientific” evidence that has not been validated by the scientific community.[34](#_bookmark33)

The NRC report reflects the scientific community’s most recent and comprehensive study of the forensic sciences in the United States. The report makes clear that, although the current state of the science may permit firearms examiners to conclude that a piece of ammunition was fired from a certain *class* of firearms, more rigorous scientific research and objective protocols are needed before firearms examiners can conclude to any degree of certainty that a piece of ammunition was fired from a certain *individual* firearm. Accordingly, this Court should hold that, until the “pattern-matching” methodology used by firearms examiners is validated by the scientific community, *Frye* precludes the admission of expert testimony concluding that two sets of toolmarks “match to a practical certainty,” or “to a reasonable degree of certainty” of any sort.

A hearing is requested on this motion.

Respectfully submitted,

Ronald Horton, Esq. #388653

Quo Judkins, Esq. #501072

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34 Editorial, *Innocents in Prison*, Wash. Post, Dec. 27, 2009, at A22 (noting that the “second biggest cause” of wrongful convictions is “faulty forensics,” such as the hair analysis that contributed to the wrongful murder conviction of Donald Gates in D.C. Superior Court).

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing motion has been served, by hand, upon Office of the United States Attorney, 555 Fourth Street, NW, Washington, D.C. 20530, attention Michael Brittin, Esq., on this day of October, 2010.

Quo Judkins

# EXHIBIT A

EXHIBIT B

EXHIBIT C

EXHIBIT D

EXHIBIT E1

EXHIBIT E2

EXHIBIT F