IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEW MEXICO

THE UNITED STATES OF AMERICA,

Plaintiff,

vs. No. CR 10-2734 JCH

JOHN CHARLES McCLUSKEY,

Defendant.

MOTION TO EXCLUDE FIREARM IDENTIFICATION EVIDENCE, AND REQUEST FOR DAUBERT HEARING

COMES NOW, Defendant John Charles McCluskey, by and through his counsel of record, Michael Burt and Theresa Duncan, and pursuant to Federal Rules of Evidence Rules 104(a), 402, 403, 702, 703, Federal Rule of Criminal Procedure Rule 16 and the Fifth, Sixth, and Eighth Amendments to the United States Constitution, and respectfully submits this Motion to Exclude Firearm Identification Evidence And Request For *Daubert* Hearing .

The grounds for this motion are: (1) there is no reliable scientific basis for this proposed testimony, and thus the testimony is inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999); (2) the testimony is inadmissible under the 2000 amendments to Rule 702 in that (a) the testimony is not based upon sufficient facts or data, (b) the testimony is not the product of reliable principles and methods, and (c) the firearms examiner who performed the bullet comparison in this case has not applied the principles and methods reliably to the facts of the case; (3) the subjective conclusion, unsupported by statistical analysis,

that a particular bullet or cartridge case was fired from a particular weapon, or cannot be eliminated as having been fired from the weapon. is so weak as to lack any probative value; and (4) any weak probative value of the proposed testimony is also substantially outweighed by the danger of unfair prejudice, confusion of the issues, and misleading the jury, and by considerations of undue delay, waste of time, and needless presentation of cumulative evidence and is thus inadmissible under F.R. Evid. 403 and the due process, fair trial, and cruel and unusual punishment provisions of the Constitution and 18 U.S. C. § 3593(c). In addition, the testimony should be excluded because of the government's failure to comply with Federal Rules of Criminal Procedure Rule 16 and this Court's scheduling order.

This Motion is based on this Motion, the attached memorandum of points and authorities, the CD of exhibits which is being filed manually because of the size of the six exhibits thereon, and any oral and documentary evidence and argument as may be produced at the hearing on said motion.

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I. Statement of Facts and Threshold Objections

This motion addresses the admissibility of firearm examiner testimony based on a microscopic comparison of known and questioned bullets and cartridge casings. The relevant facts in support of the motion are as follows.

On June 30, 2011, the Court entered a preliminary discovery order consistent with D.N.M.LR-Cr. 16.1. [Doc. 203.] Under that Order, Mr. McCluskey is deemed to have requested discovery under Fed. R. Crim. P. 16 unless he filed a waiver within seven days from the entry of the Order. [*Id.*] Mr. McCluskey did not file a waiver. On September 9, 2011, this Court entered a Scheduling Order which set January 20, 2012 as the "[d]eadline for government to complete all summaries and provide all reports on all experts, with all foundational data to be disclosed by February 17, 2012." [Doc. 220, p.1]. The Court set March 30, 2012 as the "[d]eadline for defense *Daubert* motions directed at government experts." (Id.).[1]

On January 30, 2012, the government filed a four page Notice of Intention To Offer Expert Testimony [Doc. 261]. This Notice concedes that the Notice itself does not comply with Rule 16(a)(1)(G), or this Court's Scheduling Order, for it explicitly states that "the United States will provide the experts' credentials, summaries, and reports as separate discovery, and foundational information at a later time..." (Id.). The Notice purports to be only a "list of experts and the subject area of their expected testimony." (Id.) The list includes the names of fifteen named experts in fourteen different areas of forensic science. The list does not constitute "a written summary of testimony...[which] describe[s] the witness's opinions, the bases and reasons

[1]The Court has since extended the deadline to April 22, 2012. [Doc. 416].

for those opinions, and the witness's qualifications." Federal Rule of Criminal Procedure, Rule 16(a)(1)(G). Instead, for each expert the Notice lists certain broad subject matters, and then indicates that the expert's testimony "will include discussion of" that broad topic, without indicating what that discussion will consist of. For example, with respect to the firearm examiner's testimony at issue in the present motion, the notice merely states that the United States gives notice that it intends to introduce certain expert testimony, including the testimony of :

> Katarina Babcock, Forensic Analyst, New Mexico Department of Public Safety Forensic Laboratory. Testimony will include the analysis in the area of firearms and tool marks in regards to the evidence collected.

[Doc. 261, p. 3].

On January 30, 2012, Mr. McCluskey filed a Motion to Compel Production of Expert Disclosures in Compliance with Rules 16(a)(1)(G) and this Court's Scheduling Order, for Depositions of Government Experts Pursuant to Rules 2, 16(a)(2), and 57, and for Adjustment of Scheduling Order. [Doc. 292]. In response to the motion, the government indicated that "[t]he United States will agree to provide to Defendant and this Court a further summary under Rules 702, 703, or 705 of the Federal Rules of Evidence of evidence it intends to present during its case-in-chief pursuant to Rule 16(a)(1)(G)." [Doc. 332, p. 50]. The government also indicated that depositions of the government's experts was unnecessary because "numerous Daubert motions presumably will be heard by this Court wherein the experts for the Government will testify, as well as being available to testify at trial and subject to cross-examination." (Id.)

On March 30, 2012, over two months after the Court's January 20, 2012, deadline, the government filed a Supplemental Notice of Intent to Offer Expert Testimony. [Doc. 383]. The

Supplemental Notice lists eleven expert witnesses.[2]

The summary with respect to the firearm examiner's testimony is as follows:

> The United States intends to call Supervising Forensic Scientist - Firearms/Tool Mark Examiner, and Technical Leader, New Mexico Department of Public Safety Forensic Laboratory, Katharina P. Babcock, to testify regarding her experience and training in the areas of Firearms and Tool Mark Examination. Ms. Babcock is also certified, and expected to testify about, her Association of Firearms and Tool Mark Examiners (AFTE) certification in Firearm Evidence Examination and Identification. Ms. Babcock, who has practiced in her field since 1999, is expected to testify regarding the examination into the weapons, ammunition, projectile, and casings recovered in this case. A member of the AFTE since 2001, Ms. Babcock has attended numerous courses and training throughout the years to give her the ability to make conclusions on the firearms she examines. Her report was provided to Defendant and his counsel on February 1, 2012 (bates range 5052-5056). The basis for her opinion, and her qualifications have been provided as discovery to Defendant and his counsel. Foundational information was provided February 16, 2012 and consisted of approximately 109 pages, which included detailed testing results and worksheets.
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> Ms. Babcock is expected to testify regarding the chain of custody of the items she received, the subsequent examination of the firearms, ammunition, projectile, and casings in this case. She is expected to testify regarding the steps she took to cleanse the casings recovered from the burned camper, and subsequent identification of such. She is also expected to testify regarding the microscopic comparison she conducted on several items, as well as discuss the items that were unsuitable for microscopic comparison. She is expected to testify regarding the stereomicroscope she used in her examination, as well as photographs she took. Ms. Babcock is expected to testify regarding her test fires of the firearms and that they all functioned as designed. She is also expected to testify regarding the Leica DMC comparison microscope used in examining test casings fired from the firearms, to casings taken into evidence. Her testimony will include her expert opinion and specialized knowledge in firearm and tool mark examination, derived from her education, training, and professional experience.

[Doc. 386, p. 6-7].

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[2] Four witnesses listed in the original notice (Dr. Nadia Granger, Dr. Lee M. Blum, Dan Wright, and Andrew Armstong) are not listed in the supplemental notice. In conversation with counsel following the last court appearance on April 3, 2012, the government clarified that the government did not intend to call these four witnesses. The government indicated agreement to Mr. McCluskey's position that he reserves the right to file *Daubert* or other motions challenging the admissibility of these four witnesses should the government change its position.

As explained in detail below, the supplemental notice, like the original notice, does not constitute "a written summary of testimony...[which] describe[s] the witness's opinions, the bases and reasons for those opinions, and the witness's qualifications." Federal Rule of Criminal Procedure, Rule 16(a)(1)(G). Saying that "[h]er testimony will include her expert opinion", does not tell us what that opinion is. Saying that her opinions will be "derived from her education, training, and professional experience" does not begin to describe "the bases and reasons for those opinions."

The referenced report [Discovery 5052-5056], included on the Exhibit CD as Exhibit 2, does not solve the problem because the conclusions stated therein, like the supplemental notice, do not state, "the bases and reasons for [the] opinions", but are instead phrased in intentionally vague, equivocal, and conclusory terms that provide no idea what the specific opinions are, or why the expert concluded as she did. The specific opinions that are challenged in this motion on Rule 16, *Daubert,* and other grounds are as follows:

(1) "The item G3 fired bullet can neither be identified nor eliminated from having been fired from the item 1B22 or IB72 pistols. There was agreement in all discernable class characteristics; however, item G3 is damaged and lacks individual characteristics.";

(2) "The item G7 fired cartridge case can neither be identified nor eliminated as having been fired in the item I B22 pistol. Although there was some agreement of individual characteristics and agreement in all discernable class characteristics when compared to test fired cartridge cases from item 1B22, it was insufficient for an identification.";

(3) "The item G 11 fired cartridge case can neither be identified nor eliminated as having been fired in the item 1 B22 pistol. Although there was some agreement of individual

characteristics and agreement in all discernable class characteristics when compared to test fired cartridge cases from item 1B22, it was insufficient for an identification.";

(4) "The item G 13 fired cartridge case is identified as being fired in the item 1B22 pistol.";

(5) "The item pwl, pw2, pw3, pw7 and pw9 cartridge cases are identified as being fired in the item 1B72 .40 Smith & Wesson caliber, Smith & Wesson brand, model SW40VE semi-automatic pistol bearing the serial number PDB5557.";

(6) "The item pw4, pw5, pw6, pw8 and pw10 cartridge cases are identified as being fired in the item Colorado 1 .40 Smith & Wesson caliber, Hi-Point Firearms brand, model4095 semi-automatic rifle bearing the serial number H18087." (Discovery 5052-5056).

The government's supplemental notice insinuates that the defendant can understand the bases and reasons for these opinions by consulting the "detailed testing results and worksheets" provided as foundational material. [Doc. 386, p. 7]. The foundational material provided by the government is included on the Exhibit CD as Exhibit 3. The Court will search this material in vain for any explanation of how the expert was able to reach any of the conclusions stated above. Admittedly, these pages contain relevant information. For instance, the analyst documents that item G 3 is a bullet jacket that "appears to be heavily burned/charred with no core material inside..." [Disc.6280]. She documents that item G7 is "[o]ne (1) heavily burned/charred fired cartridge casing loose in a box, and that item G 11 is "one (1) heavily burned/charred fired cartridge casing-.40 S & W caliber, Blazer headstamp." (Id.) She documents that item G 13 is "one (1) heavily burned/ charred fired cartridge casing." [Disc. 6282].

What is not documented in any meaningful way is the basis of the identifications made on

items G 13 and pw 1-10, or the quasi- identifications made on items G3, G 7, and G 11 . For instance, for item G 13, the analyst writes in her notes, "[t]here was agreement of a combination of individual characteristics and all discernable class characteristics, specifically the breechface marks were identified. A photomicrograph was taken. See it for details." [Disc. 6294]. The referenced photomicrographs are at Disc. 6348, 6351. A review of them shows a side-by-side photograph of item G 13 and the test cartridge fired from the 1B22 pistol. There are no points of similarity documented on the photographs and no way to know what marks on the breechface led to the conclusion that G 13 and the test fired cartridge were fired from the same weapon. The identical problem exists with respect to all seven of the opinions noted above.

At the outset, therefore, Mr. McCluskey moves to exclude any firearm examination testimony on the ground that the government's failure to provide an adequate summary and "all" foundational data as ordered by the Court makes it impossible for this Court to determine, as it is required to do under Daubert and Rule 702, whether: (a) the testimony is based upon sufficient facts or data, (b) the testimony is the product of reliable principles and methods, and (c) the firearm examiner who performed the comparison in this case has applied the principles and methods reliably to the facts of the case.[3]

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[3]See, United States v. Rodriguez-Felix, 450 F.3d 1117, 1125 (10th Cir.2006) (finding no abuse of discretion when the district court excluded testimony based on the "woefully inadequate" report regarding proffered testimony); United States v. Stokes 388 F.3d 21, 27 (1st Cir. 2004) ("Providing the district court with information underlying the expert's assumptions and conclusions allows the court to 'gauge whether the testimony would be helpful to the jury or would confuse or mislead instead.'"); United States v. Brien, 59 F.3d 274, 277 (1st Cir. 1995), certiorari denied 516 U.S. 953, 116 S.Ct. 401,, 133 L.Ed.2d 320 (trial court did not err in excluding expert testimony concerning fallibility of eyewitness testimony where proponent of testimony failed to present underlying data supporting opinion; "There is nothing to Brien's alternative argument that Fed.R.Evid. 705 entitled Yarmey to offer the expert testimony without disclosing the underlying data, leaving that to be developed by cross-examination. Rule 705 relates to the presentation of

Mr. McCluskey also moves to exclude the firearm identification under the Fifth Amendment (due process), the Sixth Amendment (confrontation, fair trial), and,, the Eighth Amendment guarantee of heightened evidentiary reliability in a death penalty case, because in this particular case the government's failure to adequately summarize the basis of the expert's opinion and provide all foundational data as ordered by the Court prevents Mr. McCluskey from effectively challenging and cross examining the bases of the experts' opinions.[4] An additional

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testimony at trial and, even then, is subject to the supervision of the trial judge to avoid unfairness. The rule does not impair-- indeed, has nothing to do with--the trial judge's right to insist that he or she be given the underlying information by proffer as an aid to the preliminary ruling on admissibility."); University of Rhode Island v. A.W. Chesterton Co., (1st Cir.1993), 2 F.3d 1200, 1218 (trial court did not err in precluding CPA from testifying on grounds his damage calculation was flawed where proponent offered no supporting documentation to substantiate the calculation; "Rules 703 and 705 do not afford automatic entitlements to proponents of expert testimony. ... [U]nder the broad exception to Rule 705 ('unless the court otherwise requires'), the trial court is given considerable latitude over the order in which evidence will be presented to the jury. ... While the trial court's discretion is not unfettered, at a minimum the rules suggest that the proponent must be prepared, if the court so requires, to make a limited offer of proof to aid the court in its assessment."); Ambrosini v. Labarraque, (D.C. Cir.1992), 966 F.2d 1464, 1469 (in products-liability action against drug manufacturer alleging drug caused birth defects, where trial court granted defendant's motion for summary judgement and disregarded affidavits of plaintiff's experts on grounds their opinions connecting drug to birth defects were inadmissible under Rule 703, trial court erred in failing to require experts to disclose basis for their opinions; "[P]ursuant to Rule 705, the court could have required [the experts] to disclose the bases for their opinions so that it could determine whether the opinions had an adequate foundation (i.e. whether they were based on information that experts in the field would reasonably rely on in determining whether a particular drug causes birth defects). Only then could the court determine whether the affidavits were admissible under Rule 703. A court must know the basis for an expert's opinion before it can determine that the basis is not of a type reasonably relied upon by experts in the field.").

[4] Caldwell v. Mississippi, 472 U.S. 320, 105 S.Ct. 2633, 86 L.Ed.2d 231 (1985) (vacating sentence because prosecutor's remarks were inconsistent with the "heightened 'need for reliability' " in capital cases); United States v. Taveras, 424 F. Supp. 2d 446, 462 (E.D.N.Y. 2006)("Federal courts bear responsibility for ensuring that trials before them are conducted in conformity with statutory imperatives and the fairness required by the Fifth, Sixth, and Fourteenth Amendments. Because of heightened need for reliability in capital sentencing, the court should be exceptionally careful when considering whether to admit or exclude evidence...")(Weinstein, J.); United States v. Lawson, 653 F.2d 299, 302 (7th Cir.1981), certiorari denied 102 S.Ct. 1017, 454 U.S. 1150, 71

threshold objection to the firearms examiner testimony is that the government's failure to provide an adequate summary and basis of Ms. Babcock's testimony, including the points of comparison upon which she relies violates Federal Rule of Criminal Procedure Rule 16.

Rule 16(a)(1)(G) requires that, at the defendant's request, the government "must give to the defendant a written summary of any testimony that the government intends to use under Rules 702, 703, or 705 of the Federal Rules of Evidence during its case-in-chief at trial." Fed.R.Crim.P. 16(a)(1)(G). " The rule also stipulates the content of such a written summary: it must include the expert's qualifications, describe her opinions, and state the 'the bases and reasons for those opinions.' " United States v. Brown, 592 F.3d 1088, 1090 (10 Cir. 2009), quoting Rule 16(a)(1)(G) . "The government's failure to provide an appropriate summary describing the witness's opinions, the bases and reasons for those opinions, and the witness's qualifications is ... problematic. Without such a summary, Defendant cannot adequately prepare

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L.Ed.2d 305 ("In addition to the reasonable reliance requirement of Rule 703, a criminal defendant must therefore also have access to the hearsay information relied upon by an expert witness. Without such access, effective cross-examination would be impossible. Rule 705, which provides that an expert need not disclose the facts or data underlying his opinion prior to his testimony unless the court orders otherwise, recognizes this requirement. The Advisory Committee notes to that rule state that it 'assumes that the cross-examiner has the advance knowledge which is essential for effective cross-examination.' "); United States v. Williams, 447 F.2d 1285, 1290 (5th Cir. 1971), certiorari denied 92 S.Ct. 1168, 405 U.S. 954, 31 L.Ed.2d 231 (introduction of expert opinion without opportunity to cross-examine author as to bases of opinion would infringe confrontation clause rights of defendant);United States v. Robinson, 44 F. Supp. 2d 1345, 1346 (N.D. Ga. 1997)(excluding a fingerprint expert's opinion because the government did not produce all the points of identification on which the government's expert would rely as a basis for her opinion that the defendant's prints appeared on evidence; "If a defendant does not have the bases for the government's opinion, there is no way the defendant's counsel can effectively cross-examine the expert. It is this issue, which goes to the fairness of the trial, that the court must always keep in mind in dealing with discovery issues in a criminal case."). See generally, Delaware v. Fensterer, 474 U.S. 15, 22-23, 106 S.Ct. 292, 296, 88 L.Ed.2d 15 (1985) (reserving the question of " whether the introduction of expert testimony with no basis could ... be so lacking in reliability, and so prejudicial, as to deny a defendant a fair trial.")

for trial." United States v. Lacy, 2011 WL 2600689 *2 (D.Utah 2011) (providing the names and resumes of government experts was inadequate to comply with Rule 16(a)(1)(G)).

In two decisions by a district court in the Ninth Circuit, the court set out specifically what is required to comply with Fed. R. Crim. P. 16(a)(l)(G) and Rule 16(a)(l)(F) :

> [C]ompliance with Rule 16 requires that the expert summary shall contain a complete statement signed by the expert of all opinions to be expressed and the bases and reasons for the opinions; any data or information considered by the expert in forming the opinions; the qualifications of the expert, including a list of all publications by the expert within the past ten years, and a list of all cases for which the expert has testified as an expert in trial or by deposition in the past four years.

United States v. Michel-Diaz, 205 F. Supp. 2d 1155, 1156 (D. Mont. 2002) (denying government's motion to modify a scheduling order requiring expert disclosures to include these categories of information). Accord, United States v. W.R. Grace, 402 F.Supp.2d 1178, 1181 (D.Mont.2005), aff'd on this point in United States v. W.R. Grace, 526 F.3d 499, 513 (9th Cir. 2008)(en banc)("The December 2005 enforcement order also clarified that expert disclosures must identify the documents or information that the expert reviewed in preparing his or her report, a condition well within Rule 16's requirement that expert disclosures describe 'the bases and reasons for those opinions.' The district court's orders imposing and enforcing these expert witness disclosures were clearly within its Rule 16 authority and not an abuse of its discretion.").

As the court in Michel-Diaz noted, the "purpose behind the disclosure of expert reports is to insure effective cross-examination, prevent surprise and avoid delay." Id. at 1157. Where, as here, a case involves technical and scientific evidence, detailed expert disclosures are essential to defendants' adequate preparation for trial. See United States v. Jackson, 51 F.3d 646, 651 (7th Cir. 1995) ("[C]ases involving technical or scientific evidence, may require greater disclosure,

including written and oral reports, tests, investigations, and any other information that may be recognized as a legitimate basis for an opinion under Fed. R. Evid. 703."). Counsel cannot adequately cross-examine the prosecution's scientific experts or prepare a Daubert challenge without understanding the bases underlying the reports. See, e.g., United States v. Caputo, 382 F. Supp. 2d 1045 (N.D. Ill. 2005) ("It is exceedingly difficult to cross-examine a scientific expert witness about the results of a scientific test without an opportunity to first review the test giving rise to the results."); United States v. Robinson, 44 F. Supp. 2d 1345, 1346 (N.D. Ga. 1997)(in a fingerprint case, Rule 16(a)(1)(G) required disclosure of all the points of identification on which the government's expert would rely as a basis for her opinion that the defendant's prints appeared on evidence; "[i]f a defendant does not have the bases for the government's opinion, there is no way the defendant's counsel can effectively cross-examine the expert. It is this issue, which goes to the fairness of the trial, that the court must always keep in mind in dealing with discovery issues in a criminal case.").

Thus, as Robinson holds, merely providing photographic comparison data that are merely side by side comparisons does not suffice; the specific points of identification being relied upon to make an identification must be disclosed.

As Robinson also holds, the government's failure to comply with Rule 16 and this Court's order is alone sufficient to exclude the testimony of Ms. Babcock. See also, United States v. Willock, 696 F.Supp.2d 536, 570 (D. Md. 2010)("To ensure that defense counsel can make any challenges to the admissibility of toolmark identification evidence and that courts may conduct hearings to resolve these challenges based on sufficient record, the Government should be required to strictly and timely comply with its Fed.R.Crim.P. 16 obligations regarding the

opinions to be offered by firearms examiners in sufficient detail and sufficiently far in advance of motions deadlines or trials as to enable defense counsel to evaluate the conclusions and bases, determine whether to engage experts to test them, and if appropriate, challenge them."); United States. v. Monteiro, 407 F.Supp.2d 351 (D.Mass. 2006)(ballistics expert testimony was inadmissible because examiner failed to document the basis for his notation "positive ID" with any photograph or other documentation and thus failed to comport with the field's own standards for documentation.) ; United States v. Green, 405 F.Supp.2d 104, 108 (D. Mass. 2005) (firearm examiner's ultimate opinion excluded, in part because he " took no notes, recorded no measurements, made no photographs, and drew no diagrams."); Commonwealth v. Pytou Heang, 458 Mass. 827, 847, 942 N.E.2d 927, 944 (2011)("[B]efore trial, the examiner must adequately document the findings or observations that support the examiner's ultimate opinion, and this documentary evidence, whether in the form of measurements, notes, sketches, or photographs, shall be provided in discovery, so that defense counsel will have an adequate and informed basis to cross-examine the forensic ballistics expert at trial.").

Turning to the substance of Ms. Babcok's testimony, although the government's supplemental and supporting documents do not in fact explain the bases and reasons for her opinions, defendant is able to surmise that the government proposes to have its expert identify particular cartridge casings (items G13 and pw 1-10) as having been fired from a particular weapon to the exclusion of all other weapons in the world. See, National Academy of Sciences, National Research Council, Committee on Identifying the Needs of the Forensic Science Community, *Strengthening Forensic Science in the United States: A Path Forward.* (2009) ("NAS 2009 Report") at 43 ("[A] conclusion of individualization implies that the evidence

originated from that source, to the exclusion of all other possible sources."). [5] The government also seeks to have its expert testify equivocally that a particular bullet (item G 3), and particular cartridge casings (items G7, and G11) "can neither be identified nor eliminated from having been fired from" particular weapons .

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[5] The NAS 2009 Report, written by a group of distinguished scientists and other scholars on a Committee chaired by Harry T. Edwards, Judge, United States Court of Appeals for the District of Columbia Circuit, is discussed in more detail below. Because of the importance of the NAS 2009 Report to this motion it is being provided to the Court in its entirety as on the Exhibit CD. As the Court is probably aware, the NAS is generally considered the most prestigious scientific organization in the United States, "election to the Academy is considered one of the highest honors that can be accorded a scientist or engineer," and it holds a charter "to 'investigate, examine, experiment, and report upon any subject of science or art' whenever called upon to do so by any department of the government." Reports published by the NAS's research arm, the National Research Council, "provide a public service by working outside the framework of government to ensure independent advice on matters of science, technology, and medicine. They enlist committees of the nation's top scientists, engineers, and other experts, all of whom volunteer their time to study specific concerns. The results of their deliberations have inspired some of America's most significant and lasting efforts to improve the health, education, and welfare of the population." See About the NAS, http://www.nasonline.org/site/PageServer?pagename=ABOUT_main_page. The NAS 2009 Report , therefore, constitutes an assessment not by individual scientists or scholars but by a scientific institution, the first such assessment of forensic science evidence by a mainstream scientific institution of any kind.

When the NAS speaks, courts listen. See, Melendez-Diaz v. Massachusetts, __U.S. __, 129 S.Ct. 2527, 2536, 2537, 174 L.Ed.2d 314 (2009)(quoting the 2009 NAS Report for the propositions that "[f]orensic evidence is not uniquely immune from the risk of manipulation", and that " '[t]he forensic science system, encompassing both research and practice, has serious problems that can only be addressed by a national commitment to overhaul the current structure that supports the forensic science community in this country.'"); United States v. Willock, 696 F.Supp.2d 536, 569 (D.Md.2010)("Suffice it to say that the concerns expressed by the NRC [in its NAS 2009 Report] ought to be heeded by courts in the future regarding the limits of toolmark identification evidence, and courts should guard against complacency in admitting it just because, to date, no federal court has failed to do so.") United States v. Taylor, 663 F. Supp. 2d at 1178 (quoting the 2009 NAS Report's conclusion that " "[e]ven with more training and experience using new techniques, the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates."); Commonwealth v. Gambora, 457 Mass. 715, 933 N.E.2d 50 (Mass.2010)("[C]ourts historically have found fingerprint identification evidence to be admissible. We recognize, however, that the issues highlighted in the NAS report are important, and deserve consideration.")

In the present posture of this case, the government's position appears to be that a firearm examiner should be permitted to identify a particular weapon as having fired a particular bullet merely on the say so of the examiner who, using some undisclosed methodology, and without resort to any statistical analysis, is willing to state that she can exclude all other weapons in the world as having fired the bullet. The remainder of this memorandum is devoted to demonstrating that such testimony is prohibited by Daubert v. Merrell Dow Pharmaceutical, 509 U.S. 579 (1993) and the Federal Rules of Evidence.

II. Introduction

A. The District Court's Gatekeeping Responsibility

As the Supreme Court has noted, "[t]estimony emanating from the depth and scope of specialized knowledge is very impressive to a jury. The same testimony from another source can have less effect." Ake v. Oklahoma, 470 U.S. 68, 82 n.7 (1985) (citation omitted). Consequently, when a party moves to introduce scientific, technical, or specialized expertise this Court is obligated, under Federal Rules of Evidence 104(a) and 702, to act as a "gatekeeper" to ensure the evidence "is not only relevant, but reliable." Daubert v. Merrell Dow Pharmaceutical, 509 U.S. 579, 589 (1993) (emphasis added); Kumho Tire Co. v. Carmichael, 526 U.S. 137, 141 (1999) (expanding Daubert's holding to expertise deemed "technical" or "specialized knowledge" under Rule 702); General Electric Co. v. Joiner, 522 U.S. 137, 142 (1997).[6] In order to faithfully carry out its gatekeeping responsibility, this Court must adhere to the principles

[6]Rule 104(a) reads: Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b) [pertaining to conditional admissions]. In making its determination it is not bound by the rules of evidence except those with respect to privileges.

articulated in Daubert, Kumho Tire, and Joiner.

In Daubert, the Supreme Court articulated the legal framework for how non-science federal judges are to distinguish between reliable science and "science that is junky." Kuhmo Tire, 526 U.S. at 159 (Scalia, J., concurring). This framework entails considering five (non-exhaustive) factors. First, whether the forensic "theory or technique... can be (and has been tested)." Daubert, 509 U.S. at 593. Second, "whether the theory or technique has been subjected to peer review and publication." Id. Third, whether the technique has a "known or potential rate of error." Id. at 594. Fourth, whether there exists any "standards controlling the technique's operation." Id. Fifth, whether the technique is "generally accepted" by the scientific community. Id. These factors should assist district courts in determining "whether the reasoning or methodology underlying the testimony is... valid and of whether that reasoning or methodology properly can be applied to the facts in issue." Id. at 592-593.

Rule 702 further requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702. "Relevant expert testimony must logically advance a material aspect of the case, and be sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute. " United States v. Garcia, 635 F.3d 472, 476 (10th Cir. 2011)(citations and internal quotations omitted). For instance, in this case, testimony that certain bullets or shell casings can "neither be identified nor eliminated from having been fired from" certain weapons does not assist the trier of fact to understand the evidence and does not logically advance a material aspect of the case.

These key principles (which will be elaborated on throughout Defendant's brief) were incorporated into newly amended Rule 702, which now reads:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

This "newly-expanded rule goes further than Kumho to 'provide ... some general standards that the trial court *must* use to assess the reliability and helpfulness of proffered expert testimony.'" Rudd v. General Motors Corp., 127 F.Supp.2d 1330, 1336 (M.D.Ala.2001) (emphasis in original).

> "While the inquiry into 'reliable principles and methods' has been a familiar feature of admissibility analysis under *Daubert*, the new Rule 702 appears to require a trial judge to make an evaluation that delves more into the facts than was recommended in *Daubert*, including as the rule does an inquiry into the sufficiency of the testimony's basis ('the testimony is based upon sufficient facts or data') and an inquiry into the application of a methodology to the facts ('the witness has applied the principles and methods reliably to the facts of the case') .... Neither of these two latter questions that are now mandatory under the new rule--the inquiries into the sufficiency of the testimony's basis and the reliability of the methodology's application--were expressly part of the formal admissibility analysis under *Daubert*."

(Id. at 1336).

See also, United States v. Nacchio, 555 F. 3d 1234, 1241 (10th Cir. 2009)(*en banc*)(Under amended Rule 702 and Daubert, "[r]eliability questions may concern the expert's data, method, or his application of the method to the data....The party offering the expert must show that the method employed by the expert ... is scientifically sound and that the opinion is based on facts which satisfy Rule 702's reliability requirements....[A]ny step that renders the expert's analysis unreliable ... renders the expert's testimony inadmissible. This is true whether the step completely changes a reliable methodology or merely misapplies that methodology.")(internal quotations and citations omitted); United States v. Horn, 5 F.Supp.2d 530, 554 (D.Md.,2002)("Following

the Kumho Tire decision and the December 2000 changes to Rule 702, a detailed analysis of the factual sufficiency and reliability of the methodology underlying expert testimony is required for all scientific, technical or specialized evidence, not just 'novel scientific' evidence.").

As a result of these changes, although "for many decades ballistics testimony was accepted almost without question in most federal courts in the United States", "like many other forms of expert testimony, this practice [is now] subjec[t] to new scrutiny in light of Daubert and Kumho Tire and the subsequent amendment to Federal Rule of Evidence 702, which gave to the courts a more significant gatekeeper role with respect to the admissibility of scientific and technical evidence than courts previously had played." United States v. Glynn, 578 F. Supp 2d 567, 569-570 (S.D.N.Y. 2008) . See also, United States v. Taylor 663 F.Supp.2d 1170, 1175 (D.N.M.2009)("Because firearms identification evidence has been so routinely admitted,... '[c]ourts have understandably been gun shy about questioning the reliability of [such] evidence.'.... However, as one district court recently put it, 'storm clouds ... are gathering. ... Because of the seriousness of the criticisms launched against the methodology underlying firearms identification, both by various commentators and by Defendant in this case, the Court will carefully assess the reliability of this methodology, using *Daubert* as a guide.")(citing United States v. Monteiro, 407 F.Supp.2d 351, 357 (D.Mass.2006)).

Besides Rule 702, this Court must also evaluate whether the probative value of an expert's testimony is substantially outweighed by the risk of unfair prejudice, confusion, or undue consumption of time. See, e.g., Fed. R. Evid. 403; United States v. Call, 129 F.3d 1402, 1405 (10th Cir.1997)("[E]ven if [scientific] evidence should satisfy Rule 702, it must still survive the rigors of Rule 403."); United States v. Chischilly, 30 F.3d 1144, 1156 (9th Cir. 1994).

In other words, "the expert's methods must be evaluated, not only for [this Court's] gatekeeping role, but also to understand the impact of the evidence on the jury's job as the factfinder." United States v. Green, 405 F.Supp.2d at 119 (D. Mass., 2005).[7]

The federal rules are structured to ensure that only the most accurate information is being presented to and processed by the triers of fact. More specifically, the federal rules try to make certain that "'(a) the opinions and conclusions of the expert are accompanied by information that enables the factfinder to evaluate the likely accuracy of the expert's opinion, and (b) the information is presented in such a way that factfinders will not be fooled into excessively overvaluing the testimony.'" Green, 405 F.Supp.2d at 119 (quoting Michael J. Saks, *The Legal and Scientific Evaluation of Forensic Science (Especially Fingerprint Expert Testimony)*, 33 Seton Hall L. Rev. 1167, 1167 (2003)) (emphasis added); see id. at 37 (Daubert and Kumho Tire's ruling "derive from the Court's concern about the impact of expert testimony on the jury."). These concerns are especially present in the case at bar, where the Government's firearms expert purports to testify that items G13 and pw1-10 cartridge casings were fired from a particular weapon to the exclusion of all other weapons. See United States v. Green, 405

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[7]As Justice Blackmun emphasized in Daubert:

> Rule 403 permits the exclusion of relevant evidence if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury... Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 of the present rules exercises more control over experts than over lay witnesses. Daubert, 509 U.S. at 595 (citation omitted); see also United States v. Frazier, 387 F.3d 1244, 1263 (11th Cir. 2004) ("expert testimony may be assigned talismanic significance in the eyes of lay jurors, and, therefore, the district courts must take care to weigh the value of such evidence against its potential to mislead or confuse."); United States v. Hines, 55 F.Supp.2d 62, 64 (D. Mass. 1999) ("a certain patina attaches to an expert's testimony unlike any other witness; this is 'science,' a professional's judgment, the jury may think, and give more credence to the testimony than it may deserve.").

F.Supp.2d at 119, 104 (noting that firearms identification testimony will likely garner undue consideration and weight when the proposed testimony included the phase "to the exclusion of all other firearms in the world"); United States v. Glynn, 578 F. Supp 2d at 574-575 (S.D.N.Y. 2008)(ballistics examiner would be permitted to testify only that a firearms match was "more likely than not " because "to allow Detective Valenti, or any other ballistics examiner, to testify that he had matched a bullet or casing to a particular gun 'to a reasonable degree of ballistic certainty' would seriously mislead the jury as to the nature of the expertise involved."); United States v. Taylor, 663 F.Supp.2d at 1180 ("[B]ecause 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. 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. He may only testify that, in his opinion, the bullet came from the suspect rifle to within a reasonable degree of certainty in the firearms examination field."

While "district courts have considerable leeway in determining how to assess reliability, they do not have the discretion to simply abandon their gate-keeping function by foregoing a reliability analysis." Kumho Tire, 526 U.S. at 158-59 (Scalia, J., concurring); Joiner, 522 U.S. at 147-148 (Breyer, J., concurring) ("neither the difficulty of the task nor any comparative lack of expertise can excuse the judge from exercising the 'gatekeeper' duties that the Federal Rules impose."). A district court's failure or refusal to critically review evidence through Daubert's prism may "be unreasonable, and hence an abuse of discretion." Kumho Tire, 526 U.S. at 158-59 (Scalia, J., concurring); United States v. Nacchio, 555 F. 3d 1234, 1240 (10th Cir. 2009)(en

banc)(" 'Though the district court has discretion in how it conducts the gatekeeper function, we have recognized that it has no discretion to avoid performing the gatekeeper function."), quoting Dodge v. Cotter Corp., 328 F.3d 1212, 1223 (10th Cir.2003); United States v. Workinger, 90 F.3d 1409, 1412 (9th Cir. 1996).

It must be emphasized at the outset that because this case deals with highly subjective firearm identification evidence, it is of utmost importance that this Court carry out its gatekeeping responsibilities faithfully and critically. See, e.g., United States v. Glynn, 578 F. Supp 2d at 574 ("[B]allistics examination not only lacks the rigor of science but suffers from greater uncertainty than many other kinds of forensic evidence."); United States v. Taylor, 663 F.Supp.2d at 1179 ("[W]hile there is a method underlying firearms identification evidence, and while that method has long been accepted both by the forensic science community and by courts, several significant criticisms have been levied against the field. These criticisms are serious enough that Mr. Nichols himself has felt compelled to defend his craft in writing. They are also serious enough that courts have increasingly paid attention to them."); Ramirez v. State, 810 So.2d 836, 853 (Fla. 2001) (excluding tookmark evidence, commenting on the "rising national criticism of forensic evidence" and mandating that trial judges "must... cull scientific fiction and junk science from fact.").[8] After carefully reviewing the firearm identification research (or lack

[8]The "rising national criticism of forensic evidence" is due in large part to the increasing number of wrongful convictions which can be attributed to erroneous or fraudulent forensic evidence. See Melendez-Diaz v. Massachusetts, __U.S. __, 129 S.Ct. 2527, 2536, 2538, 174 L.Ed.2d 314 (2009)("Serious deficiencies have been found in the forensic evidence used in criminal trials. One commentator asserts that '[t]he legal community now concedes, with varying degrees of urgency, that our system produces erroneous convictions based on discredited forensics.'.... One study of cases in which exonerating evidence resulted in the overturning of criminal convictions concluded that invalid forensic testimony contributed to the convictions in 60% of the cases.")(citing Metzger, *Cheating the Constitution*, 59 Vand. L.Rev. 475, 491 (2006) and Garrett & Neufeld, *Invalid*

thereof), Mr. McCluskey submits it would be "arbitrary, capricious, whimsical [and] manifestly unreasonable," and a "clear error of judgment" if this Court concluded that the bullet and shell casing identification comparison made in this case satisfy Daubert's stringent reliability and relevancy requirements. See United States v. Nacchio, 555 F. 3d 1234, 1240 (10th Cir. 2009)(en banc)("Provided the district court performs the role, this Court's review is deferential: we will not disturb the ruling 'unless it is arbitrary, capricious, whimsical or manifestly unreasonable,' or 'we are convinced that the district court made a clear error of judgment or exceeded the bounds of permissible choice in the circumstances.").

B. Burden Of Proof

It is hornbook law that the burden of proof is always placed on the adversary who wishes

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Forensic Science Testimony and Wrongful Convictions, 95 Va. L.Rev. 1, 14 (2009) See also, Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 Sci. 892 (Aug. 2005) (reporting that forensic testing errors were responsible for wrongful convictions in 63% of the 86 DNA exoneration cases reported by the Innocence Project); Craig Cooley, *Forensic Science and Capital Punishment Reform: an "Intellectually Honest" Assessment*, 17 Geo. Mason U. Civ. Rts. L.J. 299, 386 (2007)(documenting numerous cases of forensic fraud); Craig M. Cooley, *Reforming the Forensic Science Community to Avert the Ultimate Injustice*, 15 Stan L. & Pol'y Rev. 381, 395-397, 435-440 (2004) (listing and discussing capital and non-capital wrongful convictions attributable to forensic evidence). As Judge Nancy Gertner has commented in a firearm identification case:

> Indeed, recent reexaminations of relatively established forensic testimony have produced striking results. Saks and Koehler, for example, report that forensic testing errors were responsible for wrongful convictions in 63% of the 86 DNA exoneration cases reported by the Innocence Project at Cardozo Law School.

Green, 405 F.Supp.2d at 109 n.6 (citing Saks & Koehler, *supra*).

See also, United States v. Bentham,414 F.Supp.2d 472 (S.D.N.Y. 2006)("False positives-that is, inaccurate incriminating test results-are endemic to much of what passes for 'forensic science.'")(citing Saks & Koehler, *supra*). As a State Supreme Court Justice has commented, "There are numerous examples [of forensic fraud] in the literature." State v. Clifford, 121 P.3d 489, 503 n.4 (Mont. 2005) (Nelson, J., concurring) (referring to Fred Zain, Ralph Erdman, and Arnold Melnikoff).

to introduce a particular type of evidence.[9] It is no different when it comes to expert testimony, as the proponent (in this case the Government) must demonstrate that its expert's proposed testimony satisfies Rules 702 and 403. See United States v. Nacchio, 555 F. 3d 1234, 1241 (10th Cir. 2009)(en banc)("The proponent of expert testimony bears the burden of showing that its proffered expert's testimony is admissible."); Daubert v. Merrill Dow Pharmaceuticals, 43 F.3d 1311, 1318-1319 (9th Cir. 1995). Indeed, in Daubert, the Supreme Court explicitly stated that the burden of proof is set by Rule 104(a), and requires that the proponent of the evidence show by a preponderance of the proof that the basis for the proffered expert opinion is reliable. See Daubert, 509 U.S. at 592 n.10 (citing Bourjaily v. United States, 483 U.S. 171, 175-176 (1987)).

As the Supreme Court more recently declared, "[s]ince *Daubert* ... parties relying on expert evidence have had notice of *the exacting standards of reliability* such evidence must meet." Weisgram v. Marley Co., 528 U.S. 440, 455; 120 S.Ct. 1011, 1021; 145 L.Ed.2d 958 (2000) (emphasis added). See also, United States v. Frazier, 387 F. 3d 1244, 1260 (11th Cir. 2004) ("This function 'inherently require[s] the trial court to conduct an exacting analysis' of the foundations of expert testimony to ensure they meet the standards for admissibility under Rule 702.") (en banc). "The importance of Daubert's gatekeeping function cannot be overstated." Frazier, 387 F. 3d at 1260).

The government cannot sustain its burden in this case by cliches such as "What they do is they eyeball it. I mean, they are experts", or " they are going to make their

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[9]See Charles Alan Wright & Arthur R. Miller, Federal Practice and Procedure § 5053 ("Normally the proponent of the evidence will have the burden of proving the facts upon which admissibility depends, though often the objector will have the burden of producing evidence to show the existence of grounds for the objection.").

determination based on that and their experience." The Committee Note to the 2000 Amendments of Rule 702 expressly says that "[i]f the witness is relying solely or primarily on experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. The trial court's gatekeeping function requires more than simply 'taking the expert's word for it.'" As stated by Dr. John Thornton, " [m]any witnesses have learned to invoke experience as a means of circumventing the responsibility of supporting an opinion with hard facts. For the witness, it eases cross-examination. But it also removes the scientific basis for the opinion."John Thornton, The General Assumptions and Rationale Of Forensic Identification, in David L. Faigman, David H. Kaye, Michael J. Saks, Joseph Sanders, 3 Modern Scientific Evidence: The Law and Science of Expert Testimony (2012 ed.) § 29:21. See also, Zenith Electronics Corp. v. WH-TV Broadcasting Corp., 395 F.3d 416, 418-19 (7th Cir.2005)(when asked what methods he used to generate his conclusions, expert "repeatedly answered 'my expertise'... which is to say that he either had no method or could not describe one.").[10]

Consequently, similar to toxic tort cases, the Government must present sufficient evidence regarding the general theories ("general causation") and specific theories ("specific

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[10] See also, Fuesting v. Zimmer, Inc., 421 F.3d 528, 535 (7th Cir. 2005)("[P]ossessing requisite credentials alone is not enough to render expert testimony admissible"); United States v. Frazier, 387 F.3d 1244 (11th Cir. 2004)("Quite simply, under Rule 702, the reliability criterion remains a discrete, independent, and important requirement for admissibility....If admissibility could be established merely by the ipse dixit of an admittedly qualified expert, the reliability prong would be, for all practical purposes, subsumed by the qualification prong."); Clark v. Takata Corp., 192 F.3d 750, 759 n. 5 (7th Cir.1999) ("A supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are reliable and relevant under the test set forth by the Supreme Court in *Daubert*.") Richman v. Sheahan, 415 F.Supp.2d 929, 934 (N.D.Ill.2006)("Just as proof of negligence in the air will not do, neither will proof of expertise in the abstract. A snappy resume does not ensure admissibility.")

causation") of toolmark identification. With respect to the general theories, the government must present evidence demonstrating (a) all firearms exist in unique, one-of-a-kind fashion throughout the course of their existence, (b) each firearm is capable of leaving equally distinctive traces of itself in any environment, and (c) the techniques of observation, measurement, and inference utilized by firearm examiners are adequate to link these traces back to the one and only object which produced them. Green, 405 F.Supp.2d at 118-119 . If the government cannot establish these general theories of firearm identification, then this Court's inquiry comes to a halt because the Government has failed to meet its burden under Rules 104(a) and 702.

However, if the Government presents sufficient evidence to demonstrate the validity of the general theories, it must still present sufficient evidence regarding the specific ("task at hand") theory of firearm identification. See Green, 405 F.Supp.2d at 120 ("The issue is not whether the field in general uses a reliable methodology, but the reliability of the expert's methodology in the case at bar, i.e. whether it is valid for the purposes for which it is being offered, or what the Court has described as a question of 'fit.'") (emphasis in original). Cf., United States v. Sullivan, 246 F.Supp. 2d 700, 702, (E.D. Ky. 2003) ("Accepting the uniqueness and permanence of fingerprints, however, does not force the conclusion that law enforcement or other entities have developed a sound and reliable methodology for identifying or excluding individuals based on the comparison of fingerprints."). Thus, the Government must put forth evidence demonstrating that (e) its firearm examiners can accurately link a bullet or cartridge casing to the one and only firearm which could have created the mark. See Richard A. Grybowski & John E. Murdock, *Firearm and Toolmark Identification–Meeting the Daubert Challenge*, 30 Ass'n Firearms & Tool Mark Examiners J. 3, 6-7 (1998) (discussing the premises

which support toolmark identification).[11]

As will be discussed infra, if the Government cannot meet either one of these requirements it has failed to meet its burden thereby forcing this Court to exclude the government's firearm testimony.

This Court should be aware of three arguments which the Government has presented in the past to circumvent the burden of proof requirement. First, it has typically been argued that presenting some evidence of the uniqueness of bullet or shell casing markings proves the reliability of the particular comparison methodology being used in the case at hand. But presenting evidence which establishes that bullet or shell casing markings are unique is irrelevant to the issue of whether firearm examiners can accurately link markings to the one and only firearm that produced the marks to the exclusion of all others in the world. Aptly termed the "examiner's fallacy" by social scientist and fingerprint historian Simon Cole, the "examiner's fallacy consists of reasoning that the uniqueness of the object of forensic study vouches for the validity of a forensic matching process."[12] Accordingly, if the Government can only establish

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[11]As this Court will quickly notice, defendants' brief repeatedly highlights these four issues, particularly in light of Kumho Tire's "task at hand" requirement. See Kumho Tire, 529 U.S. at 153-154. This requirement will be discussed in more detail infra.

[12]Simon A. Cole, *Grandfathering Evidence, Fingerprint Admissibility Rulings From Jennings to Llera Plaza and Back Again*, 41 Am Crim. L. Rev. 1189, 1198 (2004); See also NAS 2009 Report at 43 ("The question is less a matter of whether each person's fingerprints are permanent and unique—uniqueness is commonly assumed—and more a matter of whether one can determine with adequate reliability that the finger that left an imperfect impression at a crime scene is the same finger that left an impression (with different imperfections) in a file of fingerprints."); David A. Stoney, *Measurement of Fingerprint Individuality, in Advances in Fingerprint Technology, in* Advances in Fingerprint Technology 31 (Henry C. Lee & Robert E. Gaensslen eds., 2d ed. 2001) ("The...premise [of] uniqueness... is also irrelevant. We are concerned with comparison of two printed reproductions of this skin surface. What amount of detail is reliably retained in a print? Can we recognize it? Can we accurately determine correspondence in this detail? How reliably can we

uniqueness, but not examiner accuracy, then it has failed to meet its burden under Rule 702.

Second, the Government cannot argue that "because toolmark identification evidence has been deemed admissible by many other courts, the burden of proving such evidence to be unreliable should shift to the defendants." United States v. Monteiro, 407 F.Supp.2d at 356(D. Mass. 2006). As the district court succinctly explained in Monteiro, "[b]ecause reliability under Daubert is among the preliminary inquiries a court must address under Fed. R. Evid. 104(a), the burden of proof with respect to reliability remains on the proponent of the evidence." Id.[13]

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form conclusions from the correspondence?").

[13]While the Defendant agrees with the Monteiro court's decision regarding the Government burden of proof, it does not agree with the courts conclusion that shell casing comparisons are reliable under Daubert. The court in Monteiro placed primary emphasis on the fact that "toolmark identification evidence has been deemed admissible by many other courts." Most of this case law is terribly outdated, as it was premised on Frye's general acceptance standard which the Supreme Court held was superceded by Rule 702. See Daubert, 509 U.S. at 587-590. Thus, simply because various courts accepted toolmark or firearm evidence under Frye's general acceptance standard has absolutely no bearing on this Court's reliability analysis under Rules 702 and 403. See United States v. Prim, 363 F. 3d 1028, 1033 (9th Cir. 2004)("In accordance with Kumho Tire, the broad discretion and flexibility given to trial judges to determine how and to what degree [the Daubert] factors should be used to evaluate the reliability of expert testimony dictate a case-by-case review rather than a general pronouncement that in this Circuit [a well accepted technique] is reliable. As the Supreme Court concluded,we can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert*, nor can we now do so for subsets of cases categorized by category of expert or by kind of evidence. Too much depends upon the particular circumstances of the particular case at issue."); Ramirez v. State, 542 So.2d 352, 355 (1989) (We reject the state's argument that, since the Supreme Court of Kansas... admitted testimony that a particular knife caused the wound, without a predicate of scientific reliability, we should do likewise."). See also, United States v. Santillan, 1999 WL 1201765 at p. 4 (N.D. Cal. 1999) ("The government is correct in their assertion that pre-Daubert/Kumho/ Ninth Circuit precedent supports the admissibility of (handwriting) testimony; however, the world has changed. The Court believes that . . . a past history of admissibility does not relieve this Court of the responsibility of now conducting Daubert/Kumho analysis as to this proffered expert testimony.");United States v. Hines, 55 F.Supp. 62, 67 (D. Mass. 1999) ("The Court is plainly inviting a reexamination even of 'generally accepted' venerable, technical fields."). Indeed, in United States v. Glynn, 578 F. Supp. 2d 567, 569 (S.D. N.Y. 2008), based on some of the same evidence Mr. McCluskey presents here, the Court placed severe limitations on the admissibility of firearm testimony, despite its acknowledgment that " for many

The Government has tried this tactic in fingerprinting cases and, remarkably, has had some success even though the case law is unmistakably clear on this point. See, e.g., United States v. Havvard, 117 F.Supp.2d 848 (S.D.Ind. 2000); United States v. Joseph, 2001 WL 515213 at *1 (E.D. La. May 14, 2001); United States v. Crisp, 324 F.3d 261, 267 (4th Cir. 2003).[14] The Government may likely try this tactic in Mr. McCluskey's case given the paucity of research supporting the claim that firearms examiners can accurately link a bullet or cartridge csing to the one and only firearm which created a mark on the bullet or casing. If this Court were to rule in the Government's favor and shift the burden to the (indigent) defendant, this would have untoward consequences for the entire criminal justice system, in that why would any fireaarm examiner (or any forensic examiner for that matter) ever cooperate in any future empirical testing programs? They would seem, individually and as a group, to have little to gain and very much to lose. This would only hinder the truth-seeking functions of our adversarial system because the triers of fact would never be afforded adequate information regarding the accuracy of forensic identification experts. Consequently, Mr. McCluskey would request that this Court not allow the Government to circumvent its burden by shifting the burden to him.[15]

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decades ballistics testimony was accepted almost without question in most federal courts in the United States." The Court did allow the expert to testify that a firearms match was "more likely than not ", but in doing so the Court did not have the benefit of the 2009 National Research Council study discussed below.

[14]As Professor Saks astutely commented: "[T]he plainest reading of the[se] opinion[s] is that the court[s] expected the opponent to prove that asserted fingerprint expertise did not meet the requirements of Daubert, rather than requiring the proponent to prove that it did. That is an erroneous application of the law."Saks (*Fingerprinting*), *supra*, at 1174.

[15]This burden shifting tactic is not only antithetical to clearly established legal principles, it cannot be reconciled with conventional methods of scientific investigation. Scientists are trained to seek out and establish the parameters of their respective fields of science. They determine these

C. The "Task at Hand" Requirement

Kumho Tire clarified and expanded Daubert in two significant ways. First, as mentioned, it made clear that federal judges have a significant gatekeeping responsibility to evaluate the reliability of all proffered expertise under Rule 702 not just proffers of "scientific" evidence. See Kumho Tire, 526 U.S. at 141. The second, less explicit but no less important, is that this judgment must be made concerning the "task at hand," instead of globally in regard to the average dependability of a broadly defined area of expertise.[16] The Supreme Court made this principle clear when it wrote:

> Contrary to respondents' suggestion, the specific issue before the court was not the reasonableness in general of a tire expert's use of a visual and tactile inspection... Rather, it was the reasonableness of using such an approach, along with [the expert's] particular method of analyzing the data thereby obtained, to draw a conclusion regarding the particular matter to which the expert testimony was directly relevant... The relevant issue was whether the expert could reliably determine the cause of *this* tire's separation. Kumho Tire, 529 U.S. at 153-154 (emphasis in original).[17]

The Tenth Circuit has reaffirmed the "task at hand" requirement in United States v.

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limitations by conducting proactive research, not by simply making seemingly intuitive assertions (i.e., all firearm marks are unique) and then forcing the public (or in this case the indigent Defendant) to prove the invalidity of their untested assertions.

[16]This phrase originally appeared offhandedly in Daubert, 509 U.S. at 597 (1993), but was quoted at the beginning of the Kumho Tire opinion, 526 U.S. at 141, and appropriately captures the particularized methodology of Kumho Tire.

[17]One can see the Kumho Tire task-at-hand approach prefigured in the following language from Justice Rehnquist's opinion in Joiner:

> Of course, whether animal studies can ever be a proper foundation for an expert's opinion was not the issue. The issue was whether these experts' opinions were sufficiently supported by the animal studies on which they purported to rely. The studies were so dissimilar to the facts presented in this litigation [that it was not an abuse of discretion for the District Court to have rejected the experts' reliance on them. (Joiner, 522 U.S. at 144-145 (emphasis in original)).

Nacchio, 555 F. 3d 1258(10th Cir. 2009)(en banc):

> It appears that Mr. Nacchio relied on Professor Fischel's qualifications to tip the balance in favor of the admissibility of his expert testimony. In doing so, Mr. Nacchio ignored the precept that when assessing expert testimony, "the question before the trial court [i]s specific, not general." Kumho Tire, 526 U.S. at 156, 119 S.Ct. 1167. Although Professor Fischel generally has been permitted to testify in the past, and a district court might well respect his credentials, the court had an obligation to assess the methodology that Professor Fischel had employed in the case at hand. See id. at 153-56, 119 S.Ct. 1167; Rodriguez-Felix, 450 F.3d at 1122. Mr. Nacchio could not assume that his expert's testimony would be admitted because other courts had allowed it in; he had to carry his burden of demonstrating the admissibility of Professor Fischel's testimony in this particular case. Mr. Nacchio, however, failed to satisfy the district court that Professor Fischel's testimony was reliable. Thus, the district court was well within its discretion in excluding it.

1. The Two Levels of Proof Required Under Daubert and Kumho Tire

Consequently, Kumho Tire forces the Government to establish two levels of proof: (a) a general level; and (b) a specific level.

a. General Level

Most courts have correctly discerned some of the general assumptions underlying firearm testimony . See e.g., United States v. Glynn, 578 F.Supp.2d at 572 ("Firearm and toolmark analysis rests on the twin assumptions that the surface contours of every gun are unique and that, every time that gun is fired, some of those unique markings, along with markings caused by the act of firing itself, are transferred to the shell casing and bullet, leaving distinctive patterns on each of them."); United States v. Taylor, 663 F.Supp.2d at 1180 (" The basic theory underlying firearm identification, and all toolmark identification for that matter, is that each individual tool leaves unique marks which can be used to identify it to the exclusion of all other tools.")

However, there is actually more to it. A DNA analogy might be helpful. In DNA profiling, there is a general level (and a specific level) as well. In DNA, this involves all

principles which transcend any particular cases, including the propositions (1) that everyone's DNA is unique, except for identical twins, (2) that each genetic factor is independent, thus permitting the use of the "product rule" for determining random match probabilities, and (3) that STR/PCR methodology accurately (i.e., validly) and consistently (i.e., reliably) profiles the relevant segment of DNA, and others. In firearms analysis, proponents would thus have to show (1) that the empirical basis permits identifications to be make (either uniquely which, of course, is impossible) or with some probabilistic statement–as in DNA–(which, of course, they cannot do, because the base-rates are unknown), (2) that some technology is generally available which permits the phenomenon of interest to be studied systematically (and is repeatable), and (3) that this technology produces accurate and consistent results across the cases. See, Green, 405 F.Supp.2d at 118-119;ourth *The Legal Standards For the Admissibility of Scientific Evidence, in* 1 Modern Scientific Evidence 23-25 (David L. Faigman et al., eds. 2012).

If the Government fails to satisfy any of these three prongs, then this Court need not even consider the next level of analysis. For instance, in toxic tort cases plaintiffs have the burden of demonstrating general causation and specific causation. In a silicone implant case, for example, general causation requires that you show that the substance causes the condition in the population, i.e., do silicone implants cause autoimmune disorders? In toxic court cases, if the plaintiff cannot show general causation, i.e., silicone implants do not cause autoimmune disorders, then the case comes to an abrupt end. See, e.g., Norris v. Baxter Health Care Corp., 397 F.3d 878, 881 (10th Cir. 2005) ("We cannot consider whether Plaintiff's silicone breast implants caused her specific autoimmune disease until Plaintiff presents reliable evidence that silicone breast implants are capable of causing disease in people in general."); Raynor v. Merrell

Pharms., Inc., 323 U.S. App. D.C. 23, 104 F.3d 1371, 1376 (D.C. Cir. 1997) (causation in toxic tort cases is discussed in terms of general causation and specific causation); Jones v. United States, 933 F. Supp. 894, 900-01 (N.D. Cal. 1996), aff'd, 127 F.3d 1154 (9th Cir. 1997). The same holds true for the Government in this case. If the Government cannot establish the general theory of firearm identification then the Court's inquiry must end.

b. Specific Level

At the specific level, the Government is obligated to put forth evidence establishing another fundamental premise which comprises the theory of firearm identification. This theory postulates that trained firearms examiners are capable of identifying unique identifiers (or striations) on bullets and shell casings and linking these distinctive marks to the one and only firearm which could have produced these unique striations. Consequently, the Government has the burden of presenting evidence which demonstrates that the methodology used by its firearms examiner to identify these unique striations has been legitimately tested and proven to be a valid method for identifying and linking these unique identifiers to the one and only firearm which could have created the toolmark. The Government's responsibility under Kumho Tire, however, does not end there, as it then must present evidence which establishes its experts' proficiency (or accuracy) at employing this valid methodology, and that the other requirements of Rule 702 have been met.

If the Government fails to present evidence relating to any one of these premises then they have failed to meet its burden under Daubert and Kumho Tire.

2. Firearms Identification Is Scientifically Bankrupt, Subjective, and Law Enforcement Tilted

Firearms identification is a subspeciality of toolmark identification. [18] "Firearms identification is a discipline of forensic science which has as its primary concern to determine if a bullet, cartridge case or other ammunition component was fired by a particular firearm." Association of Firearm and Tool Mark Examiners, *Glossary* 80 (1980); see also United States v. Green, 405 F.Supp.2d 104 (D. Mass.2005) (thoroughly describing and limiting firearm identification testimony); United States v. Willock, 696 F.Supp.2d 536 (D.Md.2010)(same); United States v. Taylor, 663 F.Supp.2d 1170 (D.N.M. 2009)(same); United States v. Glynn, 578 F. Supp 2d 567 (S.D.N.Y. 2008)(same); United States v. Diaz, 2007 WL 485967(N.D.Cal. 2007)(same); United States v. Monteiro, 407 F.Supp.2d 351(D. Mass. 2006) (same); Sexton v. State, 93 S.W.3d 96 (Tex. Crim. App. 2002) (rejecting matching of cartridge cases based on magazine marks alone without recovery of underlying magazine).

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[18] See, e.g., Paul C. Gianelli & Edward J. Imwinkelried, 1 Scientific Evidence at 632 ("Firearms identification could be considered a subspeciality of toolmark identification: the firearm (tool) imprints its individual characteristics on the bullet."); T.M. Van Dijk, *Tools*, in 3 Encyclopedia of Forensic Science 1216-1217 (Jay Siegel et al., eds. 2000), ("The identification of both projectiles and cartridge cases (firearm identification) is recognized as *a* specialized toolmark examination discipline. The marks left by screwdrivers, crowbars or other implements used to force doors, premises, etc., axe marks in wood, the restamping of vehicle engine numbers, the marks left by pliers, bolt cutters, knives, etc., the use of hammers, multigrips and other implements, have all been the subject of toolmark identification work.) (emphasis added); Adina Schwartz, *A Systemic Challenge to the Reliability and Admissibility of Firearms and Toolmark Identification*, 6 Colum. Sci. & Tech. L. Rev. 2 (2005) ("Firearms identification is a subspecies of toolmark identification dealing with the toolmarks that bullets, cartridge cases, and shotshell components acquire by being fired and that unfired cartridge cases and shotshells acquire by being worked through the action of a firearm.") (emphasis added); Walter F. Rowe, *Firearms and Tool Mark Examinations, in* Forensic Science: An Introduction to Scientific and Investigative Techniques 327 (J. James & J. Norby eds. 2003) (distinguishing between toolmark and firearm identification);Charles E. O'Hara & James W. Osterburg, Criminalistics: The Application of the Physical Sciences to the Detection of Crime 121 (2d. 1974) ("The method of proof [in toolmark identification] is similar to that of a firearms identification.").

On the other hand, "the primary objective [of toolmark identification] is to relate one physical object with another, by determining if a toolmark was made by a particular implement." T.M. Van Dijk, *Tools*, in 3 Encyclopedia of Forensic Science 1216 (Jay Siegel et al., eds. 2000). See, Ramirez v. State, 810 So.2d 836 (Fla. 2001) (thoroughly describing and excluding toolmark identification testimony).

At the outset, it is important to point out that neither firearms nor toolmark identifications are on firm grounding as evidenced by the opinions just cited. As stated in Glynn, citing Green, Monterio, and Diaz, "three federal judges have addressed the scientific status *vel non* of ballistics identification testimony, and all three have concluded that, in one respect or another, it does not have sufficient rigor to be received as science." 578 F. Supp. 2d at 571. Judge Rakoff in Glynn was the fourth federal judge to so conclude. Judge Johnson in Taylor was the fifth. See United States v. Taylor, 663 F.Supp.2d at 1179 (D.N.M. 2009)(quoting the portion of Glynn cited above and concluding that "[t]This Court adopts the reasoning of the courts in Green, Monteiro, Diaz, and Glynn."). Judge Quarles in Willock was the sixth. See also, Ramirez v. State 810 So. 2d. 836 (Fla. 2001)("In sum, Hart's knife mark identification procedure--at this point in time--cannot be said to carry the imprimatur of science. The procedure is a classic example of the kind of novel 'scientific' evidence that *Frye* was intended to banish--i.e., a subjective, untested, unverifiable identification procedure that purports to be infallible.").

As these cases make clear, "[s]torm clouds... are gathering" over toolmark and firearms identifications because they are "based primarily on a visual inspection of patterns of toolmarks, and is largely a subjective determination based on experience and expertise."United States v. Monteiro, 407 F.Supp.2d 351, 355. See also, United States v. Willock, 696 F.Supp.2d at 560

("The subjective evaluation leaves substantial latitude in reaching conclusions. Indeed, the AFTE's most ardent supporter, Ronald Nichols of the ...[ATF] ... acknowledges the subjective component of toolmark examiners undertaking to discern 'sufficient agreement' in a toolmark identification, stating that 'there is no universal agreement as to how much correspondence exceeds the best-known nonmatching situation.'"); United States v. Taylor, 663 F.Supp.2d at 1178 ("Even the Government concedes that 'the field continues to rely on a subjective match standard.' "). Likewise, the likelihood of error is great because it is extremely difficult to "distinguish[] between class, subclass, and individual characteristics." Id. As the Monterio court noted and as the CD Exhibit 1 declaration of defense expert Adina Schwartz confirms: "a firearm 'may be wrongly identified as the source of a toolmark it did not produce if an examiner confuses subclass characteristics shared by more than one tool with individual characteristics unique to one and only one tool.'" Id. at 363 (citation omitted); United States v. Taylor, 663 F.Supp.2d at 1177 ("Even more problematic, bullets fired from different guns may have significantly similar markings, reflecting class or sub-class, rather than individual, characteristics."); Declaration of Adina Schwartz, CD Exhibit 1, p. 25 ("The danger that misidentifications will result from confusing subclass with individual characteristics is particularly great because firearms and toolmark examiners have not arrived at either strict rules for determining whether a microscopic pattern on a toolmark is an individual or a subclass characteristic or strict rules as to which tools or manufacturing processes do or do not produce toolmarks with subclass characteristics.")

Furthermore, pro-prosecution bias can and does affect the reliability of firearms examinations because the "'field' consists entirely of individuals who work for law enforcement

agencies. " Green, 405 F.Supp.2d at 109 n.7. See also, Melendez-Diaz v. Massachusetts, __U.S. __, 129 S.Ct. 2527, 2536, 2538, 174 L.Ed.2d 314 (2009)(acknowledging the 2009 NAS Report's discussion of "problems of subjectivity, bias, and unreliability of common forensic tests such as...toolmark and firearms analysis."). for the propositions that "[f]orensic evidence is not uniquely immune from the risk of manipulation"). As the NAS 2009 Report states, "[f]orensic scientists who sit administratively in law enforcement agencies or prosecutors' offices, or who are hired by those units, are subject to a general risk of bias." NAS 2009 Report at 185.

Its reliability is also called into question because, according to the firearms community, it "'is not possible to calculate an absolute error rate for routine casework.'" Monteiro, 407 F.Supp.2d at 367 (citation omitted). See also, United States v. Taylor, 663 F.Supp.2d at 1177 ("In his testimony at the Daubert hearing in this case, [the government's expert] agreed that no actual error rate has been calculated for the field at this point."); United States v. Diaz, 2007 WL 485967 at *9 (N.D.Cal. Feb 12, 2007) ("No true error rate will ever be calculated so long as the firearm-examiner community continues to rely on the subjective traditional pattern matching method of identification."); Declaration of Adina Schwartz, CD Exhibit 1, p. 51 ("The absence of agreed-upon, objective criteria for resolving disputes about whether identification conclusions are warranted in a particular case means that a day-to-day error rate cannot be calculated for the discipline of firearms and toolmark identification.")

Additionally, "there are no national standards to be applied to evaluate how many marks must match." Green, 405 F.Supp.2d at 114. See also, Taylor, 663 F.Supp.2d at 1177 ("The AFTE Theory, thus, does not provide any uniform numerical standard examiners can use to determine whether or not there is a match and, indeed, Mr. Nichols indicated in his testimony that most

AFT examiners do not use any numerical standard. Instead, the AFTE theory is circular."); Glynn, 578 F. Supp 2d at 574 ("[B]allistics comparison lacks defining standards to a degree that exceeds most other kinds of forensic expertise. For example, whereas both a ballistics examiner and a fingerprint examiner are ultimately called upon to make a subjective judgment of whether the agreement between two pieces of evidence is "sufficient" to constitute a "match," a fingerprint examiner may not declare a match unless a pre-specified number of "points" of similarity exist between the two samples....Although attempts been made to introduce similar minimum standards and 'protocols' into ballistics analysis, such attempts have not yet met with general acceptance...") [19]

The likelihood of error is also amplified due to the fact observer effects can easily influence a firearms examiner's conclusions. See Green, 405 F.Supp.2d at at 131; Taylor, 663 F.Supp.2d at 1178-79 ("Generally, as was done in this case, the examiner is handed only one suspect weapon and the recovered projectile or projectiles...The problem with this practice is the same kind of problem that has troubled courts with respect to show-up identifications of people: it creates a potentially significant 'observer effect' whereby the examiner knows that he is testing a suspect weapon and may be predisposed to find a match."); Declaration of Adina Schwartz, p. 55 ("An additional severe problem with firearms and toolmark identification is observer bias.")(reviewing the literature) .

And finally, again as documented in Dr. Schwartz's Declaration and in the two very recent National Reseach Council Reports she reviews, firearms is in effect scientifically bankrupt

[19] In this case, the government concedes this point when it provides a conclusory Rule 16 summary which does not reference any points of identity or standard of comparison.

because the community has yet to empirically test the fundamental premises which give it life. As Judge Gertner commented:

> While this is not traditional science, it does not mean it is without scientific pretension: It is empirical, based on observations of physical objects. It makes assumptions about the physical world: 1) that each gun--like individual DNA--is unique, because it is made by a metal tool that changes over time; 2) the use of the gun by the consumer causes it to wear in a unique way; 3) the gun's unique signature will be transferred to the projectiles that emerge from it, imprinted on them through the firing pin; 4) an expert can identify that unique signature by visual comparison. There is no reason why these premises and observations cannot be tested under the Daubert-Kumho standards -- using sound research methods yielding meaningful data on error rates. The problem is that they have never been tested in the field in general, or in this case in particular. Green, 405 F.Supp.2d at 118-119 (emphasis added).

Perhaps the most obvious indicator that the firearms field is scientifically bankrupt, besides the aforementioned passage, can be witnessed from the following quote: "[Daubert challenges] 'represent the biggest challenge facing the firearms discipline since it was firmly established in the 1920's.'" Monterio, 407 F.Supp.2d at 364 (D. Mass. 2006) (quoting Sgt. Gerard Dutton, *Ethics in Forensic Firearms Investigation*, 37 Ass'n Firearm & Toolmark Examiners J. 79, 82 (2005)). If the field's scientific foundations were firmly established in the 1920s, then why would Daubert challenges represent the greatest menace to the firearms community in more than eighty years? The truth, as authoritatively documented in the 2009 NAS Report is that "many forensic tests- such as thosee used to infer the source of toolmarks...-have never been exposed to stringint scientific scrutiny", that "the scientific knowledge base for toolmark and firearm analysis is fairly limited", and that "[e]ven with more training and experience using new techniques, the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates." NAS Report, p. 42, 153-154.

3. Toolmark Identification v. Firearms Identification

The Government cannot meet its burden by simply making the now untrue global claim that toolmark identification is and has been a generally accepted form of identification for decades. Rather, the Government must present sufficient evidence establishing that its firearm examiners can reliably testify to absolute opinions such as "the item G13 fired cartridge case is identified as being fired in the item 1B22 pistol." See, NAS Report at 43 ("[A] conclusion of individualization implies that the evidence originated from that source, to the exclusion of all other possible sources."). Generally, the Government must put forth evidence which demonstrates (a) each firearm is unique; (b) this uniqueness is transferred to any bullet or shell it comes into contact with; and (c) the methodology of identifying these unique characteristics and then linking them to the one and only firearm that could have produced them is valid (i.e., accurate) and reliable (i.e., consistent). See, Green, 405 F.Supp.2d at 118-119 . Specifically, the Government must demonstrate that (d) its firearm examiners are highly accurate at not only discriminating between class, subclass, and individual characteristics,[20] but at also linking a markings to the one and only firearm which could have produced the markings.

If the Government proffers evidence relating to toolmark identification in general the relevance of this evidence must be called into question because it would not satisfy the "fit" requirement identified in Daubert. As the Supreme Court stressed: "Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful." Daubert, 509 U.S. at 591 (citation omitted). Toolmark comparisons in general are not at issue in Defendant's case. As a result, it is "not relevant and, ergo, not helpful." Id.

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[20]These different types of toolmark characteristics will be discussed in more detail infra.

Moreover, "scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes." Id. As will be explained in more detail infra, the manner is which toolmarks are created by tools is so fundamentally different than how marks are implanted onto discharged bullets that the alleged validity of toolmark identification cannot carry over to firearms identification.

Accordingly, because the "task at hand" in the present case deals strictly with firearm identification, this Court is mandated by Kumho Tire to disregard any evidence the Government may offer relating to toolmark identification in general to satisfy its burden of proof. See Green, 405 F.Supp.2d at 120 ("The issue is not whether the field in general uses a reliable methodology, but the reliability of the expert's methodology in the case at bar, i.e. whether it is valid for the purposes for which it is being offered, or what the Court has described as a question of 'fit.'") (emphasis in original).[21] For instance, in toxic tort cases, courts regularly excluded

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[21]An excellent illustration of where a district judge prohibited forensic testimony (i.e., handwriting identification) because it failed to meet the "task at hand" requirement is United States v. Fujii, 152 F.Supp.2d 939 (N.D.Ill. 2000). In Fujii, the district judge distinguished between cursive writing and handprinting:

> This court need not weigh in on this question, however, for whether handwriting analysis *per se* meets the Daubert standards, its application to this case poses more significant problems. The questioned writing in this case was handprinting. Typical handwriting analysis involves cursive writing, and the record is devoid of evidence that there is even a recognized field of expertise in the identification of handprinting.... The reliability of handprinting identification, however, is only part of the problem. The government has offered no evidence that Ms. Cox's expertise extends to making an identification of handprinting when the handprinter[s] in question are native Japanese writers.
>
> Does Ms. Cox have any expertise which would allow her to distinguish between unique characteristics of an individual Japanese handprinter and characteristics that might be common to many or all native Japanese handprinters? In an analysis that depends entirely on what is similar between writing specimens and what is different, it would seem to this court essential that an expert have some ability to screen out characteristics which might appear eccentric to the writer, compared to native English printers, but which might in fact be

evidence that Drug A caused plaintiff's birth defects when the suit involves Drug B. See *The Legal Relevance of Toxicological Research, in* 2 Modern Scientific Evidence 258-277 (David L. Faigman et al. eds., 1997) (discussing the toxic tort caselaw).

Accordingly, this Court's primary responsibility is to critically evaluate the Government's firearm identification evidence and determine whether this evidence establishes the remarkable claim made by its expert–namely, that he is able to individualize bullet and cartridge case markings to the one and only firearm which could have produced the markings.

4. Observer Effects/Context Effects

After Kumho Tire this Court must consider any factor which could be shown to affect the reliability of an expert's testimony under the "particular circumstances of the particular case." Kumho Tire, 526 U.S. at 150. Because Kumho Tire obligates a district court to make a reliability determination under Rule 702 where the "factual basis, data, principles, [or] method[s]" employed by the expert "are called sufficiently into question," Id. at 149, it would seem incumbent to consider factors bearing on reliability that are not necessarily encompassed in the Daubert criteria.

On such factor was noted by Judge Johnson in Taylor, 663 F.Supp.2d at 1178-79:

> One additional problem with firearms examination, not necessarily neatly encapsulated by any one of the *Daubert* factors, bears mentioning. Generally, as was done in this case, the examiner is handed only one suspect weapon and the recovered projectile or projectiles. As one district court has pointed out, this method of testing is, "in effect, an evidentiary 'show-up,' not what scientists would regard as a 'blind test.' " Green, 405 F.Supp.2d at 107-108. Indeed, Defendant made the statement in his brief, left unrefuted by the Government's

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characteristic of most or all native Japanese writers, schooled in English printing in Japan, in printing English. There is no evidence in the record that Ms. Cox has such expertise or has even considered the problem Mr. Litwicki has pointed out. (Id. at 940).

> written argument and by Mr. Nichols in his testimony, that "neither the firearm community, specifically, nor the forensic science community, generally, have ever conducted double-blind independent proficiency tests aimed at determining the accuracy (or inaccuracy) of firearm examiners." Deft. Brf. [Doc. 277] at 56 (citing Alfred Biasotti & John Murdoch, 3 Modern Scientific Evidence 143, 217-18 (David L. Faigman et al. eds. 1997)). The problem with this practice is the same kind of problem that has troubled courts with respect to show-up identifications of people: it creates a potentially significant "observer effect" whereby the examiner knows that he is testing a suspect weapon and may be predisposed to find a match.

The NAS 2009 Report points out that "[t]he forensic science disciplines are just beginning to become aware of contextual bias and the dangers it poses. The traps created by such biases can be very subtle, and typically one is not aware that his or her judgment is being affected." NAS 2009 Report, p. 185. Dr. Schwartz's extnsive review of the literature on this point fully justifies her conclusion that "[a]n additional severe problem with firearms and toolmark identification is observer bias." (Exhibit 1, pp. 55-58).

The examiner bias or observer effect phenomenon is governed by the basic tenet of cognitive psychology which states that the desires and expectations individuals harbor influence their perceptions of what they observe. Stated differently, the results of one's observations depend upon the observer's state of mind as well as the thing being observed.[22] To fall prey to such unconscious effects, scientific observers must generally (a) confront an ambiguous stimulus capable of producing varying interpretations and (b) be made aware (directly or indirectly) of an expected or desired outcome. See Ulric Neisser, Cognition and Reality: Principles and

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[22] See, e.g., D. Michael Risinger et al., *The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 Cal. L. Rev. 1, 12 (2002); Michael J. Saks et al., *Context Effects in Forensic Science: A Review and Application of the Science of Science to Crime Laboratory Practice in the United States*, 43 Sci. & Just. 119 (2003); Robert Rosenthal, Experimenter Effects in Behavioral Research (1966).

Implications of Cognitive Psychology 43-45 (1976).

Firearm identification is, without question, a highly subjective endeavor. See, e.g., Taylor, 663 F.Supp.2d at 1178 ("Even the Government concedes that 'the field continues to rely on a subjective match standard.'"); Glynn 578 F. Supp. 2d at 572 ("[B]allistics opinions are significantly subjective. Moreover, the standard defining when an examiner should declare a match--namely, "sufficient agreement"--is inherently vague."); Ramirez, 810 So.2d at 847; NRC 2009 Report at 153-154 ("[T]he decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates."); Id. at 155 ("A fundamental problem with toolmark and firearms analysis is the lack of a precisely defined process [for reaching identifications]."); Stephen G. Bunch, *Consecutive Matching Striation Criteria: A General Critique*, 45 J. Forensic Sci. 955, 955 (2000) ("An objective decision-making regime, which purportedly describes the counting of striations, appears more likely to successfully meet a Daubert challenge than does the subjective regime that currently prevails in the discipline.").

Likewise, forensic examiners generally receive a large amount of domain-irrelevant data which has no bearing on their analysis, yet can greatly impact the accuracy of their analysis because of the expectation this information creates. For instance,

> [i]n the examination and identification of human hair... investigators usually submit the questioned and known suspect hair samples along with a synopsis of facts surrounding the investigation. The main purpose of the synopsis is to provide information to the examiner that may assist in the analysis. The synopsis usually contains the facts and circumstances leading to the arrest of a suspect. In some cases, the synopsis may even include eyewitness accounts, other forms of physical evidence collected in the case, and admissions or confessions made by the suspect.

Larry S. Miller, *Procedural Bias in Forensic Science Examinations of Human Hair*, 11

Law & Hum. Behav. 157, 158 (1987) (emphasis added). In short, examiner bias is the "tendency to resolve ambiguous stimuli in a manner consistent with expectations." William C. Thompson, *DNA Evidence in the O.J. Simpson Trial*, 67 U. Colo. L. Rev. 827, 845 (1996).

Two things stick out in regards to the firearm analysis and report in this case which should give this Court cause for concern. First, the expert only evaluated particular bullets and cartridges against other bullets and cartridges fired from guns known to be associated with Mr. McCluskey or his co-defendants. (i.e., single sample testing). Single-sample forensic testing is equivalent to a "show-up" in eyewitness identifications. A"show-up," in eyewitness terms, is an identification procedure where an eyewitness is presented with a single suspect for identification. See Technical Working Group for Eyewitness Evidence, United States Dep't of Justice, Eyewitness Evidence: A Guide for Law Enforcement (1999). Eyewitness research has continually recognized an assortment of problems associated with show-ups. See Gary L. Wells et al., *Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads*, 22 Law & Hum. Behav. 603 (1998). The Supreme Court has even commented that a show-up raises reliability concerns because it is a highly "suggestive procedure." Manson v. Brathwaite, 432 U.S. 98, 107 (1976).

> Considering forensic examiners and eyewitnesses perform comparable identification tasks, the same weaknesses will undoubtedly emerge during single-sample forensic evaluations. The biggest drawback is the identifier immediately expects (consciously or subconsciously) to find inculpatory value in the object being viewed. This expectation is rational because most individuals presume law enforcement officials do not simply pick up objects or individuals for no reason. The reasonable inference is if law enforcement felt so compelled to collect evidence or detain a suspect they must have had more than a sneaking suspicion the evidence or suspect is in some way connected to the criminal offense. Research supports this notion, as researchers in one study discovered 90% of forensic examinations result in an inculpatory finding. See Joseph L. Peterson et al., Forensic Evidence and the Police 117 (National Institute of Justice Research Report, 1984).

Judge Nancy Gertner has commented on the inherent problems with forensic evidence show-ups in two cases. In her most recent opinion regarding the admissibility of firearms evidence Judge Gernter wrote:

> The only weapon [the Government's expert] was shown was the suspect one; the only inquiry was whether the shell casings found earlier matched it. It was, in effect, an evidentiary "show-up," not what scientists would regard as a "blind" test. He was not asked to try to match the casings to the other test-fired Hi Point weapons in police custody, or any other gun for that matter, an examination more equivalent to an evidentiary "line-up." His work was reviewed by another officer, who did the same thing—checked his conclusions under the same conditions—another evidentiary "show-up."... In effect, the examination was an evidence show up (do these casings come from this gun?), not an evidence line-up (from which gun do these casings come?).
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> Green, 405 F.Supp.2d at 107-108.

Judge Gertner also made a similar observation with respect to handwriting experts:

> Indeed, [Professor] Denbeaux draws an interesting analogy to eyewitness identification. Courts have concluded, as a matter of law, that one-on-one show-ups are unduly suggestive. Likewise, Denbeaux suggests, are one-on-one handwriting comparisons. The outcome of this analysis, for example, may be different if Harrison were given a 'lineup' of similar handwriting exemplars to review, and asked to determine which of this group is most similar to the robbery note author. Hines, 55 F.Supp.2d at 69-70.[23]

Again, as Judge Gertner astutely commented: "an identification would be open to far less criticism if it were similar to that of photo identification. In other words, using several unidentified writings and then determining if any of the writings were produced by the same individual." Id. at 70 n.20.[24]

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[23] See also Williamson, 904 F.Supp. at 1553 ("Susan Land testified that although she had hair samples from many individuals, the only samples she mounted on microscope slides were those from the victim, Petitioner [Ronald Williamson] and [Dennis] Fritz."). It should be emphasized that Williamson and Fritz were wrongly convicted and sentenced to death based in large part from misidentified hairs. *See* Cooley, *supra*, at 435 (discussing Ronald Williamson's wrongful conviction and death sentence).

[24] Evidence lineups, though currently rarely employed, are not unheard of. In State v. Stokes, 433 So. 2d 96 (La. 1983), a murder case, the trial court, as a condition of compelling the defendant

As noted above, Judge Johnson noted this same problem in United States v. Taylor, 663 F. Supp. 2d at 1178-1179 .

Second, as in challenges to fingerprint comparison testimony, the proponents of firearms identification testimony often point to protocol requirements that the examiner's conclusion must always be verified by an independent examiner. The meager documentation provided in support of the expert witness summary in this case indicates that some type of administrative and technical review took place on January 12, 2012, seven days after the date of Ms. Babcock's report. [Exibit 3, p. 6279]. There is also an indication that the identification on items p 3 was verified by an Alena Sanchez on April 7, 2011, that the identifications on items p 4 was verified by her on July 7, 2011, and that the identification of item G 13 was verified by her on September 24, 2011. [Exhibit 3, p. 6289, 6302, 6338]. However, the qualifications and methodology of the reviewer has not been disclosed, and it is thus unclear at this point what review procedures were actually followed. Since the government has failed to provide this crucial information, an evidentiary hearing should be conducted. See, United States. v. Monteiro, 407 F.Supp.2d 351 (D.Mass.,2006)(ballistics expert testimony was inadmissible because it failed to comport with the field's own standards for documentation and peer review)

But even if such verification procedure were followed it was in all likelihood a situation where the second examiner knew the results of the first examination before she began her

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to submit to dental casting for comparison to bitemarks found on the victim's body, required that the defendant's casts be presented to the forensic odontologist identified only by a code number, and accompanied by four other casts of the teeth of males of the same general age as the defendant, two to be selected by the prosecution and two by the defense. The expert was unable to form a conclusion, saying only that he could not rule out any of the sets of teeth represented by the various casts as the source of the bitemarks. Id. at 103.

examination. Several courts have spotted the obvious flaw in this biasing procedure. See, United States v. Glynn, 578 F. Supp. 2d at 575 n. 5 ("Valenti had repeated a prior analysis of the evidence by another examiner, and--contrary to the basic scientific principle of 'blind' studies--viewed the prior analyst's comparison and conclusion before conducting his own."). United States v. Green, 405 F. Supp. 2d at 116 ("Nor is it clear that O'Shea's examination was reviewed by another, unbiased examiner. Under Boston Police policy, more than one person must examine the evidence to make an identification-that is, someone must review the initial identification.... But there are no notes of this subsequent review and no indication it was blind testing. The second examiner knew that O'Shea had already identified a match."); United States v. Plaza, 179 F. Supp. 2d 492, 505 n. 11 (E.D. Pa. 2002), opinion vacated on other grounds, 188 F. Supp. 2d 549 ("With respect to the ACE-V process at issue here, reliance on a second examiner's same result as a confirmatory 'test' is subject to the further dilution that, not infrequently, the second examiner has been advised of the prior result."); Commonwealth v. Patterson, 445 Mass. 626, 840 N.E.2d 12 (Mass. 2005)("In her original order regarding latent fingerprint identification, the judge correctly concluded that the verification process of ACE-V was seriously flawed and did not constitute peer review under Daubert. We share the judge's consternation with the current verification process.").

It is significant that in the analogous field of fingerprint comparison, the FBI has admitted that three of its most experienced fingerprint "experts" and one equally experienced defense expert erroneously identified a latent print in the Madrid bombing case as belonging to an Oregon lawyer after the lawyer's print came up as the number 4 candidate of possible suspects generated by an AFIS computer search. According to the FBI's official version of these multiple

misidentifications, they were caused because

> The power of the IAFIS match, coupled with the inherent pressure of working an extremely high-profile case, was thought to have influenced the initial examiner's judgment and subsequent examination. This influence was recognized as confirmation bias (or context effect) and describes the mind-set in which the expectations with which people approach a task of observation will affect their perceptions and interpretations of what they observe....
>
> Once the mind-set occurred with the initial examiner, the subsequent examinations were tainted. Latent print examiners routinely conduct verifications in which they know the previous examiners' results without influencing their conclusions. However, because of the inherent pressure of such a high-profile case, the power of an IAFIS match in conjunction with the similarities in the candidate's print, and the knowledge of the previous examiners' conclusions (especially since the initial examiner was a highly respected supervisor with many years of experience), it was concluded that subsequent examinations were incomplete and inaccurate. To disagree was not an expected response.

(Robert B. Stacey, Unit Chief, Quality Assurance and Training Unit, Federal Bureau of Investigation, *Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, Forensic Science Communication, Jan. 2005, Vol. 7, No. 1, available at http://www.fbi.gov/hq/lab/fsc/backissu/jan2005/special_report/2005_special_report.htm.

The report goes on to recommend these minimum safeguards for preventing such errors in the future:

> Procedures that require descriptive documentation (graphic, textual, or a combination of both) of the ACE-V process and blind verification (i.e., previous results unknown to the verifier) should be implemented on designated cases. This documentation should also note areas of discrepancies in the prints and explanations for these discrepancies. The original examiner's document should be sealed or withheld from the verifier. The verifier would then conduct his or her examination independently and document the characteristics and discrepancies that were considered during the examination. Technical reviews of each examiner's descriptive documentation would then reveal any conflicting analyses and results, would require open communication and discussionamong examiners, and would require resolution. The verifiers must do an independent and complete ACE-V examination of each print that they are verifying. The verifiers must be willing to oppose any

> examiner if they do not see the details needed to effect the identification decision. The quality assurance program should make examiners feel that they can disagree about any identification. The examiners should be encouraged to step forward, without fear of reprisal if they disagree. This part of the scientific method must be institutionalized. (Stacey Report, supra)

As far as Mr. McCluskey is aware, no such safeguards were adhered to in this case, although the problem of "confirmation bias (or context effect)" is exactly the same for firearm examiners. Accordingly, the Government is obligated to present evidence and research explaining how, in general, the firearms examiner profession minimizes the impact of observer effects and, specifically, what preventative measures the experts took in this case to blunt the impact of these imperceptible effects. More importantly, the Government simply cannot rely on their experts bald assertion that they can, by exercising his unique will power, purge their conscious of any impurities which can taint their analysis.

If the government's experts make this (remarkable) assertion, what they in fact are claiming is that their training consists of something, which is noticeably absent in all other scientific fields, which makes them invulnerable to context effects.[25]

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[25]This is not a question which need be the subject of speculation and argument. The NAS 2009 Report notes that '[s]ome initial and striking research has uncovered the effects of some biases in forensic science procedures..." NAS 2009 Report at 185 (citing several studies). In one of the cited studies, Itiel E. Dror, et al., *Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications*, Forensic Sci. International (2005), Itiel Dror and his colleagues found that only one out of five fingerprint experts made an identification of a print which they had each previously identified in an actual case when they were given contextual information that indicated that the prints were not a match. In another study, the same researchers found that the tendency to identify ambigious fingerprints was significantly increased when the examiners were presented with a gory crime as the contect for the examination. Itiel E. Dror, et al., *When Emotins Get the Better of Us: The Effect of Contextual Top-down Processing on Matching Fingerprints*, 19 Applied Cognitive Psychology 799 (2005). Another study found that the results of hair comparisons varied as a function of the manner in which the samples were presented to the examiner: traditional paired comparison of a questioned with a known exemplar versus a lineup style presentation. See Larry

D. Reliability

The Daubert Court made clear that the pivotal concern at the threshold is the expert opinion's "evidentiary reliability." In scientific terms, the Court explained, evidentiary reliability equates to "scientific reliability." Daubert, 509 U.S. at 590 n.9. Scientists draw sharp distinction between reliability and validity, a distinction of great importance to the issue of whether firearm comparison evidence is admissible under Daubert and Rule 702.[26]

Reliability refers to the extent to which a measuring instrument produces the same result when it is used repeatedly to measure the same object or event. See John I. Thornton & Joseph L. Peterson, *The General Assumptions and Rational of Forensic Identification, in* Science in the Law: Forensic Science Issues 19 (David L. Faigman et al. eds. 2012); United States. v. Horn, 155 F.Supp.2d 530, 538-539 (D.Md. 2002). Consequently,

> a parade of forensic scientists who make the same subjective judgment, or a series of machines that give the same readings in response to the same evidence sample, can only be said to be reliable. Id. (emphasis added).

Validity, on the other hand, refers to the degree to which a measuring instrument measures what it purports to measure. Id.; see also Horn, 155 F.Supp.2d at 538-539. In short, reliability refers to consistency, while validity refers to accuracy or correctness. Thus, "forensic scientists or machines that are in agreement may be highly reliable (in agreement with each other) without being valid (without reaching the correct answer). They can all be wrong." Id.

Miller, *Procedural Bias in Forensic Science Examinations of Human Hair*, 11 Law & Hum. Behav. 157, 159-62 (1987).

[26]As two commentators noted: "Although courts frequently and freely use the term 'reliability,' a paucity of attention is directed to that which is truly embraced by that term." Allen P. Wilkson & Ronald M. Geraghty, *Bite Mark Evidence: Its Admissibility is Hard to Swallow*, 12 W. St. U. L. Rev. 519, 528 (1985).

(emphasis added). This is a critical concept to grasp, as the forensic identification fields are notorious for trying to equate consistency with correctness.

The global theory in firearm identification is that no two firearms can possibly leave identical toolmarks and trained firearms examiners can distinguish between a variety of characteristics to link a toolmark to the one and only firearm which could have generated the toolmark. See Alfred Biasotti & John Murdoch, *The Scientific Basis of Firearms and Toolmark Identification, in* 3 Modern Scientific Evidence 143 (David L. Faigman et al. eds 1997) , at 205-227. As a result, to determine the "evidentiary reliability" or "trustworthiness" of firearm identification, the Government must present evidence which establishes the validity of the general and specific theories which breathe life into firearm identification. See Paul C. Giannelli & Edward L. Imwinkelried, 1 Courtroom Criminal Evidence at 155-156 (3rd ed. 1998); David L. Faigman et al., *Check Your Crystal Ball at the Courthouse Door, Please: Exploring the Past, Understanding the Present, and Worrying about the Future of Scientific Evidence*, 15 Cardoza L. Rev. 1799, 1825-1834 (1994).

III. A Primer On Forensic Identification–Particularly Toolmark and Firearms Identification

Because this case concerns forensic identification evidence, the following sections will briefly outline the general assumptions of individuality, why these assumptions are faulty, and how toolmark identification is fundamentally different than firearms identification. This information will enable this Court to make a more informed judgment as to whether the Government can meet its burden under Daubert and Rule 702. It is Mr. McCluskey's belief that once this Court critically evaluates this evidence and the research (or lack thereof) supporting firearms identification evidence it will conclude that such evidence is simply too scientifically

bankrupt and subjective to satisfy Daubert and Rule 702.

A. The General Assumptions of Forensic Identification

Forensic science (or criminalistics) has been called "the science of individualization." James W. Osterburg, *The Evaluation of Physical Evidence in Criminalistics: Subjective or Objective Process*?, 60 J. Crim. L. & Criminology 97, 97 (1969). Individualization is premised on the theory that no two objects, physical or nonphysical, are exactly alike. See Henry T.F. Rhodes, Alphonse Bertillon: Father of Scientific Detection 17 (1956); Keith Inman & Norah Rudin, *Principles and Practice of Criminalistics: The Profession of Forensic Science 123* at 123. Forensic individualization examiners, such as forearms examiners, are concerned with associating "striation marks" located on a bullet or shell casing to the one and only source of those "marks" to the exclusion of all others in the world.[27] The fundamental belief of forensic individualization examiners is that "that unique markings are acquired by a source item in random fashion and that such uniqueness is faithfully transmitted from the source item to the evidence item being examined." NAS 2009 Report at 43.

Individuality determinations depend on three assumptions. First, numerous forms of

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[27] See, e.g., United State v. Green, 405 F.Supp.2d 104 (D. Mass., Dec. 20, 2005) (firearms examiner testified he could identify a firearm "to the exclusion of every other firearm in the world"); United States v. Washington, 550 F.2d 320, 324 (5th Cir. 1977) ("firearms expert testified that the shell casing found in the trunk of the Mercury Comet had been fired from the pistol 'to the exclusion of all other weapons in existence'"). As Professor Saks points out, the "question posed" by these purported sciences "is whether a bullet can be traced back to the one and only one barrel through which it was fired, a signature to the hand that wrote it, a bite mark to the mouth of the biter, cut bolts to the instrument that cut them, and so on." Michael J. Saks, *Merlin and Solomon: Lessons from the Law's Formative Encounters with Forensic Identification Science*, 49 Hastings L.J. 1069, 1081 (1998). See also, NAS 2009 Report at 43 ("When the evidence and putative source items are compared, a conclusion of individualization implies that the evidence originated from that source, to the exclusion of all other possible sources.")

biological and physical entities exist in unique, one-of-a-kind fashion. Second, these entities are capable of leaving equally distinctive traces of themselves in any environment. Third, the techniques of observation, measurement, and inference utilized by crime lab technicians and examiners are adequate to link these traces back to the one and only object which produced them. See Saks (Merlin & Solomon), *supra*, at 1081. Each of these assumptions is either defective or inadequately established through empirical research.

1. The Individuality Argument: Individuality is Not a Legitimate Scientific Expectation

When skeptics and forensic watchdogs press the forensic science community for concrete evidence concerning the theory of unique identifiability, the community generally resorts to the multiplication (or product) rule. Simply stated, if objects differ on a number of independent dimensions, the probability of occurrence of any one combination is found by multiplying together the probabilities associated with each dimension. See David Freedman et al., Statistics 229 (3d ed. 1998). Not surprisingly, this generates extremely small probabilities. Armed with these persuasive (yet deceptive) probabilities, the forensic science community then appeals to the layperson's counter-intuitiveness. Unfortunately, relying on probability theory to establish unique identifiability is problematic for several reasons.

First, absolutes (i.e.., "I was able to link this bullet to this gun to the exclusion of all other guns in the world") cannot be established by using probabilistic reasoning or models.[28]

[28]Ironically, two fingerprint researchers realized this nearly sixty years ago when they concluded: "It is unfortunate that this [probabilistic] approach carries the implication that a complete correspondence of two patterns might occur, when as a matter of fact... such duplication is beyond the range of possibility." Harold Cummins & Charles Midlo, Finger Prints, Palms and Soles: An Introduction to Dermatoglyphics 154 (1943).

No scientific law has yet to be formulated explaining why individuality must be the scientific law of the land. As Professor Saks explains:

> This is not physics, where two objects cannot occupy the same place at the same time. This is micro-taxonomy, where no law of nature prevents two or many objects from falling into the same category. Any given bridge hand has a probability of occurrence of less than 1 in 600 billion. Yet it would be obvious nonsense to presume that nature has arranged the universe so that once a bridge hand is dealt it will never be dealt again. Saks (Merlin & Solomon), *supra*, at 1087.

At best, forensic examiners can only discuss the probability of a coincidental match; they cannot offer an absolute identification to the exclusion of all others in the world. See Nas 2009 Report at 184 ("The concept of individualization is that an object found at a crime scene can be uniquely associated with one particular source. By acknowledging that there can be uncertainties in this process, the concept of 'uniquely associated with' must be replaced with a probabilistic association, and other sources of the crime scene evidence cannot be completely discounted.")

As one forensic scientist explained:

> No physical feature is in itself unique; it if were, it would have occurred only once in the history of mankind, and only one particular individual. On the other hand, while never unique per se, any given physical feature does posses a certain distinguishing quality—a discrimination potential—according to its frequency of occurrence; the more frequently it occurs, the less characteristic it is. (Keiser-Nielsen, *Dental Identification: Certainty v. Probability*, 9 Forensic Sci. 87, 88 (1977)).

Moreover, Justice Blackmun echoed these concerns when he wrote: "Of course, it would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably, there are no certainties in science." Daubert, 509 U.S. at 590 (emphasis added). As one forensic scientist conceded: "There is no rational or scientific ground for making claims of absolute certainty in any of the traditional identification science which includes fingerprint, document, firearms, toolmark, and shoe and tire-tread analysis." Stephen G. Bunch,

Consecutive Matching Striation Criteria: A General Critique, 45 J. Forensic Sci. 955, 956 (2000).[29] The mere fact that the proponents of firearms identification are making claims of absolute ceratinty is telling. As Peter Huber reminds us in Galileo's Revenge: Junk Science in the Courtroom (1993), it is a particular hallmark of junk science that its proponents "often nee(d) to assert claims of great accuracy . . . ." Id. at 28. In the end, as Professor Starrs aptly stated: "What we say in forensic science is the more certain the scientist is, the less reliable the scientist is." Beth Daley, *Case Against Courtroom Science*, Toronto Star, July 18 2004, at A14. Thus, this Court should always view claims of absolutism (i.e., "to the exclusion of all others in the world") through a very cautious lens. As Judge Rakoff eloquently put it in Glynn,

> The problem [with firearm identification testimony] is how to admit it into evidence without giving the jury the impression--always a risk where forensic evidence is concerned--that it has greater reliability than its imperfect methodology permits. The problem is compounded by the tendency of ballistics experts--such as those in Brown and Glynn--to make assertions that their matches are certain beyond all doubt, that the error rate of their methodology is "zero," and other such pretensions. Although effective cross-examination may mitigate some of these dangers, the explicit premise of Daubert and Kumho Tire is that, when it

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[29] See also Paul L. Kirk & Charles R. Kingston, *Evidence Evaluation and Problems in General Criminalistics*, 9 J. Forensic Sci. 434, 435 (1964) ("[T]he first remedy is for each to abandon the idea of absolute certainty, so that a fully objective approach to the problem can be made... if it can be accepted that nothing is absolutely certain, then it becomes logical to determine the degree of confidence that may be assigned to a particular belief."). Likewise, according to one well-respected fingerprint examiner:

> [I]mposing deductive conclusions of absolute certainty upon the results of an essentially inductive process is a futile attempt to force the square peg into the round hole... [T]his categorical requirement of absolute certainty has no particular scientific principle but has evolved from a practice shaped more from allegiance to dogma than a foundation in science. Once begun, the assumption of absolute certainty as the only possible conclusion has been maintained by a system of societal indoctrination, not reason, and has achieved such a ritualistic sanctity that even mild suggestions that its premise should be re-examined are instantly regarded as acts of blasphemy. Whatever this may be, it is not science.David L. Grieve, *Possession of Truth*, 46 J. Forensic Identification 521, 527-28 (1996) (emphasis added).

> comes to expert testimony, cross-examination is inherently handicapped by the jury's own lack of background knowledge, so that the Court must play a greater role, not only in excluding unreliable testimony, but also in alerting the jury to the limitations of what is presented.

578 F. Supp. 2d at 574 [30]

Second, determining the likelihood of a coincidental match requires three things: (a) research regarding the accuracy of forensic techniques (i.e., blind proficiency testing); (b) base-rate research; and (c) statistically astute forensic examiners. The individualizing forensic sciences cannot, at this point, bring any of these things to the table. See, NAS 2009 Report, p. 44 ("The determination of uniqueness requires measurements of object attributes, data collected on the population frequency of variation in these attributes, testing of attribute independence, and calculations of the probability that different objects share a common set of observable attributes. Importantly, the results of research must be made public so that they can be reviewed, checked by others, criticized, and then revised, and this has not been done for some of the forensic science disciplines. As recently as September 2008, the Detroit Police crime laboratory was shut down

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[30] See also United States v. Crisp, 324 F.3d 261, 278 (4th Cir. 2003) (Michaels, J., dissenting) ("Professions of absolute certainty by an expert witness... seem out of place in today's courtroom. Even a DNA match has a small chance of being in error. Indeed, there is some suggestion that the certainty requirement for fingerprint identification is a false comfort."); State v. Quintana, 103 P.3d 168, 170-71 (Ct. App. Utah 2004) (Thorne, J., concurring) ("It is vital that we remove the near mystical awe that fingerprints evoke, and replace it with a more cautious regard for forensic evidence and its overall lack of certainty."); State v. Ramirez, 800 S. 2d 836, 849 (Fla. 2001("Although several of the State's experts testified that the underlying principle employed by Hart is generally accepted in the field, we conclude that this testimony standing alone is insufficient to establish admissibility under Frye in light of the fact that Hart's testing procedure possesses none of the hallmarks of acceptability that apply in the relevant scientific community to this type of evidence. This is particularly true in light of the extraordinarily precise claims of identification that Hart makes under his testing procedure-i.e., he claims that a "match" made pursuant to his method is made with absolute certainty. Such certainty, which exceeds even that of DNA testing, warrants careful scrutiny in a criminal-indeed, a capital-proceeding.")

following a Michigan State Police audit that found a 10 percent error rate in ballistic evidence.")

In regards to accuracy, the forensic science community has been reluctant to discover the accuracy of its examiners and techniques. See United States v. Taylor, 663 F.Supp.2d at 1177 ("In his testimony at the Daubert hearing in this case, Mr. Nichols agreed that no actual error rate has been calculated for the field at this point."); Green, 405 F. Supp. 2d at 119 ("There is no reason why [the] premises [of firearm examiners] cannot be tested under the Daubert-Kumho standards-using sound research methods yielding meaningful data on error rates. The problem is that they have never been tested in the field in general, or in this case in particular."); NAS 2009 Report at 153 ("[T]he decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates."); Saks & Koehler (Paradigm Shift), *supra*, at 894 ("Although Daubert's testing recommendations are familiar to most scientists, there has been remarkably little research on the accuracy of traditional forensic science."); Biasotti & Murdoch, *supra*, at 217-218 (noting that "forensic science researchers have not managed to calculate [error rates] for the forensic specialities like firearm and toolmark identification comparison that depend in part on subjective judgment."). With respect to base-rate data, besides DNA, base-rate data for the "police sciences" is nonexistent and nearly impossible to calculate. Consequently, forensic examiners simply make-up (or assume) base rates when they engage in any sort of statistical calculation. See, e.g., Ege v. Yukins , 485 F.3d 364 (6th Cir. 2007)(bitemark testimony which included unfounded statistical analysis was so unreliable that defendant's conviction violated due

process)[31] With respect to statistics, "statisticians are not criminalists and do not understand the specific character of the requirements of this field, while criminalists equally do not understand statistics, and do not know how to use them constructively." Paul L. Kirk & Charles R. Kingston, *Evidence Evaluation and Problems in General Criminalistics*, 9 J. Forensic Sci. 434, 435 (1964) (emphasis added).[32] Consequently, without any error-rates, base-rate data, or statistically competent forensic examiners, individuality determinations are, for all intents and purposes, subjective "leaps of faith." David Stoney, *What Made Us Ever Think We Could Individualize Using Statistics*?, 31 J. Forensic Sci. Soc'y 197 (1991). See also, Report of the National Research Council Committee to Assess the Feasibility, Accuracy, and Technical Capability of a National Ballistics Database, Ballistics: Ballistics Imaging (2008), included on the Exhibit CD as Exhibit 5 (hereinafter "("the NAS 2008 Report") (finding that "[t]he validity of the fundamental assumptions of uniqueness and reproducibility of firearm-related toolmarks has not yet been fully

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[31]Three decades ago, one forensic scientist wrote: "It is unwise to continue the practice of assuming probability factors, however conservative, in the development of a total probability case. Since probability or circumstantial case cannot be avoided, it is imperative that police administrators and criminal investigators alike support research efforts which will lead to a solution to these statistical problems." Joseph D. Nicol, *Criminalistics, in* Forensic Science: Scientific Investigation in Criminal Justice 234 (Joseph L. Peterson ed. 1975). For examples, see Charles R. Kingston & Paul L. Kirk, *The Use of Statistics, in* Forensic Science: Scientific Investigation in Criminal Justice 182 (Joseph L. Peterson ed. 1975); John I. Thornton, Crime Investigation 20-21 (2d. ed. John I Thornton, ed.) (1970); Luke S. May, *The Identification of Knives, Tools, and Instruments A Positive Science*, 1 Am. J. Police Sci. 246, 255 (1930); Smith & Goodman, *supra*, at 257-58 (listing several cases where hair examiners make-up base rate statistics).

[32]Many recent cases demonstrate this statistical ineptitude. See, e.g., Cooley, *supra*, at 427-428 (listing cases); Roma Khanna & Steve McVicker, *HPD Lab Troubles Predate DNA Testing; Experts' Review Finds a Pattern of Problems in 1980s Studies of Blood Samples*, HOUS. CHRON., Dec. 18, 2005, at A1 (discussing Charles Lee Hawkins' 1988 rape case and how a Houston crime lab serologist "botched his [serological] stats in a ludicrous way... excluding large numbers of people who could have contributed to that sample").

demonstrated" and concluding that "[a]dditional general research on the uniqueness and reproducibility of firearm-related toolmarks would have to be done if the basic premises of firearms identification are to be put on a more solid scientific footing."); Id. at 82 ("Conclusions drawn in firearms identification should not be made to imply the presence of a firm statistical basis when none has been demonstrated."); NAS 2009 Report at 154 (quoting the NAS 2008 Report findings); United States v. Taylor, 663 F.Supp.2d at 1175 (quoting the NAS 2008 Report's conclusion that " [a] significant amount of research would be needed to scientifically determine the degree to which firearms-related toolmarks are unique or even to qualitatively characterize the probability of uniqueness.").

2. Locard's Transfer Principle: Accepted Without Proof

Individuality's second assumption is premised on Locard's theory of exchange, which holds that every contact between individuals or objects results in a transfer of material between them. See, e.g., Edmond Locard, *The Analysis of Dust Traces*, 1 Am. J. Police Sci. 276 (1930); Edmond Locard, *The Analysis of Dust Traces*, 1 Am. J. Police Sci. 401 (Second Part) (1930). Evidence collected from the crime scene(s) and the victim represent the individual traces of the offender which he or she consciously or unconsciously left behind. Forensic science techniques were developed to identify and individualize these divergent forms of evidence so a link could potentially be established between the crime scene, the victim, and the offender. Though seemingly commonsensical, Locard's theory is just that—a theory, as it has yet to be tested or refuted. According to forensic scientists, Norah Inman and Keith Rudin: "As much as the Locard transfer theory has been invoked, no peer-reviewed literature exists that proffers it, tests it, or refutes it. It is axiomatic in forensic science; it is accepted as true without proof." Keith Inman &

Norah Rudin, *Principles and Practice of Criminalistics: The Profession of Forensic Science 123* (2000) at 94 (emphasis added). Inman and Rudin added:

> After reviewing Locard's writings, it seems to us far more likely that, rather than intentionally articulating a global principle, he was merely reflecting on the reasons a careful scrutiny of the crime scene, including victims, suspects, and witnesses, was worth the effort. Frequently (or perhaps, in Locard's mind, inevitably) contact between two objects will be indicated by small traces of each left on the other. Find the traces, and contact is established.

Id. at 85.

As Dr. Schwartz explains in the attached Declaration at p. 14,"[a]lthough firearms and toolmark examiners frequently state that *every* tool produces toolmarks with unique individual characteristics, in addition to being scientifically questionable ..., this statement is inconsistent with established knowledge within the discipline that not all manufacturing processes result in firearms or other tools with such differentiated surfaces that each tool produces toolmarks with unique, individual characteristics." Further, " [a] major difficulty in the way of reliable firearms and toolmark identifications is that the marks a tool makes change over time. This makes firearms and toolmark identification much more problematic than fingerprint identification since, except in rare cases of disease or injury, an individual's fingerprints remain the same over time." (Id. at 18) See also, United States v. Glynn, 578 F. Supp 2d at 573 ("A gun barrel may itself change slightly with each firing, such that it may leave different impressions on a bullet depending on when during the gun's life a shot is fired. Casings from the same firearm may appear markedly different because of an irregular firing or because of the manner in which they hit against various materials."); See also NRC Ballistics Imaging Report, supra, at 55 ("In the specific context of firearms and toolmark identification, derivation of an objective, statistical basis for rendering decisions is hampered by the fundamentally random nature of the firing

process. The exact same conditions - of ammunition, of wear and cleanliness of firearms parts, of burning of propellant particles, and the resulting gas pressure, and so forth - do not necessarily apply for every shot from every gun.").

3. The "Task at Hand" Claim: Talking the Talk, but Not Walking the Walk

The third premise supporting individuality is the techniques of observation, measurement, and inference utilized by crime lab technicians and examiners are adequate to link these traces back to the one and only object which produced them. The validity of this assumption depends on the accuracy of forensic techniques and examiners.

As Dr. Schwartz explains at pp. 12 of her Declaration, "[e]ven assuming *arguendo* that the toolmarks produced by firearms are reproducible and unique, firearms and toolmarks examiners have no reliable *method* for determining whether the similarities between toolmarks are so great that they must have been produced by the same gun." According to the NAS 2009 Report, "[a] fundamental problem with toolmark and firearms analysis is the lack of a precisely defined process [for reaching identifications]." NAS Report, p. 155. "[T]he decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates." Id. at 153-154. Similar criticisms of the method that firearms and toolmark examines use for reaching identification conclusions are advanced in the NAS 2008. Exhibit 5 at 82 ("Conclusions drawn in firearms identification should not be made to imply the presence of a firm statistical basis when none has been demonstrated."); id. (criticizing firearms and toolmark examiners' absolute identification conclusions for "cloak[ing] an inherently subjective assessment of match with an extreme probability statement that has no firm grounding and unrealistically implies an error rate of zero"). See also United

States v. Green, 405 F. Supp. 2d 104 at 110 (reasoning that "even assuming that some of these marks are unique to the gun in question, the issue is their significance, how the examiner can distinguish one from another, which to discount and which to focus on, how qualified he is to do so, and how reliable his examination is"); United States v. Monteiro, 407 F. Supp. 2d at 366 ("The question of whether the methodology of identifying a match between a particular cartridge case and gun is reliable requires far more analysis [than the question of whether cartridge case toolmarks are unique]"). Cf. NAS 2009 Report at 144 ("Uniqueness and persistence [of each person's fingerprints] are necessary conditions for friction ridge identification to be feasible, but these conditions do not imply that anyone can reliably discern whether or not two friction ridge impressions were made by the same person.").

"The absence of agreed-upon, objective criteria for resolving disputes about whether identification conclusions are warranted in a particular case means that a day-to-day error rate cannot be calculated for the discipline of firearms and toolmark identification." Declaration of Adina Schwartz, p. 51. See also United States v. Diaz, 2007 WL 485967 at *9 (N.D.Cal. Feb 12, 2007) ("No true error rate will ever be calculated so long as the firearm-examiner community continues to rely on the subjective traditional pattern matching method of identification.")

Further, for the reasons discussed by Dr. Schwartz, "[a]n accurate estimate of day-to-day error rates cannot be derived from the only widely used proficiency tests, the Collaborative Testing Services ('CTS') tests." (Schwartz Declaration, pp. 51-55. The limited data we do have suggests that the error rate may be as high as 10 per cent. (Id.). See also, NAS 2009 Report at 44 ("As recently as September 2008, the Detroit Police crime laboratory was shut down following a

Michigan State Police audit that found a 10 percent error rate in ballistic evidence."). [33]

The accuracy of forensic examiners and techniques can be calibrated via double-blind proficiency testing. Regrettably, forensic practitioners have been unwilling to participant in any sort of blind proficiency testing programs. When proficiency testing is undertaken, however, and the results are made public (which is rare), they suggest novice and experienced examiners alike, do not fully understand the scientific principles and procedures they are attesting to in court, as many veteran forensic experts have failed routine, non-blind proficiency tests.[34]

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[33] In Taylor, Judge Johnson stated: "Data from CTS testing done between 1978 and 1991 suggest that the rate of false identification is less than 1%. However, both Mr. Nichols and the Grzybowski article acknowledge that uneven test administration, make-up, and level of difficulty significantly limit the usefulness of this result. Nonetheless, this number at least suggests that the error rate is quite low." 663 F.Supp.2d at 1177. With all due respect, if "uneven test administration, make-up, and level of difficulty significantly limit the usefulness" of proficiency tests as measures of error rate, then they cannot "suggests that the error rate is quite low."

[34]For instance, Arnold Melnikoff of the Washington State Patrol crime lab failed a hair proficiency test when he transferred to the Washington State Police crime lab. Prior to his work in Washington, Melnikoff had been the Director of the Montana State Police crime lab system. *See* Lise Olsen, *Crime lab worker failed to qualify to test hair samples*, Seattle Post-Intelligencer, Jan. 2, 2003, at A1. Houston Police Chief Joe Breshears was forced to temporarily shut down the Houston crime lab's toxicology unit after it was revealed Pauline Louie, a 28-year veteran and one of the lab's highest-ranking analysts, failed a proficiency test. *See* Roma Khanna, *HPD's toxicology lab shut down; Division testing on hold after supervisor fails competency exam*, Hous. Chron., Oct. 30, 2003, at A1. In 1998, Charles Vaughan, a veteran forensic examiner who spent time with Oregon and Washington crime labs, failed a footwear identification proficiency test. *See* Ruth Teichroeb, *Oversight of Crime-Lab Staff Has Often Been Lax*, Seattle Post-Intelligencer, July 23, 2004, at A1. With respect to forensic odontology, 63.5% of forensic dentists in a recent proficiency test, committed false positive errors across the test cases, while 22% committed false negative errors across the test cases. More notably, the dentists were "not novice; these [were] diplomats, the most accomplished members of the field." C. Michael Bowers, *The Scientific Status of Bitemark Comparisons, in* Science in the Law: Forensic Science Issues 252 (David. L. Faigman et al. eds. 2002). In regards to fingerprinting, the results of a 1995 IAI fingerprint proficiency test were both "alarming" and "chilling." Of the 156 examiners who participated, only 68 (44%) were able to (a) properly identify the five latent print impressions that were supposed to be identified and (b) correctly note the two elimination latent prints that were not to be identified. More significantly, 34

B. Distinguishing Between Class, Subclass, and Individual Characteristics

Once a firearm examiner has (somehow) determined which type of tool could have produced the bullet or shell casing toolmarks, he or she is then confronted with the more daunting task of individualizing the toolmarks to a suspected weapon. This task is complicated in its own right because individualizing a toolmark to the one and only tool requires the ability to distinguish between three types of toolmark characteristics: (a) class characteristics; (b) subclass characteristics; and (c) individual characteristics. See Thornton & Peterson, *supra*, 5-7.

Class characteristics are universal characteristics which separate a group of objects from a cosmos of miscellaneous objects (e.g., separating the different types of Halloween candy—M&Ms go in the M&M pile; gumballs go into the gumball pile). See Monteiro, 407 F.Supp.2d at 360 ("Class characteristics are defined as 'family resemblances which will be present in all weapons of the same make and model.'") (citation omitted). Class characteristics provide the very practical function of inspecting a sizeable quantity of items by purging from consideration those items which do not share the characteristics common to all of the members of that group. Individuality, however, cannot be established with class characteristics, as it can only be established with "those exceptional characteristics that may establish the uniqueness of the

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(22%) of these examiners made flawed identifications on one or more of the questioned prints for a total of 48 misidentifications. Incorrect identifications occurred on all seven latent prints that were provided, including 13 errors made on the five latent prints that could be correctly identified to the supplied suspects. *See* David L. Grieve, *Possession of Truth*, 46 J. Forensic Identification 521 (1996) (discussing the 1995 results). A 1998 test found that only 58% of the participating examiners correctly identified all of the latent prints and recognized the two elimination latents as being unidentifiable. More disturbing, however, was the fact that 21 flawed identifications were made by 14 different examiners. *See* Michael Mears & Therese M. Day, *The Challenge of Fingerprint Comparison Opinion in the Defense of a Criminally Charged Client*, 19 Ga. St. U. L. Rev. 705, 734 (2003) (citing Collaborative Testing Services, Inc., Forensic Testing Program: Latent Prints Examination, Report No. 9808 (1998)).

object." Thornton & Peterson, *supra*, at 5. While this definition borders on the tautological (i.e., it is an individual [or unique] characteristic, if it establishes the object's uniqueness), for purposes of this section it should simply be recognized that a suspected individual characteristics might not be an individual characteristic at all, but rather a class characteristic. For instance,

> A [document] examiner may note an unusual letter formation, which in the experience of that examiner seems to be unique... . But it may be that every schoolchild in a Bulgarian town was taught to execute that particular letter formation. The characteristic may be obscure, but it is still a class characteristic, not an individual characteristic, and should be given only the weight that a class characteristic deserves and not the additional weight that ordinarily would be given to an individual characteristic. Thornton & Peterson, *supra*, at 6.

Individual characteristics, on the other hand, "are marks produced by the random imperfections or irregularities of tool surfaces. These random imperfections or irregularities are produced either incidental to manufacture or are caused by use, corrosion, or damage. They are considered unique to that tool and therefore are believed to distinguish it from all other tools." Biasotti & Murdoch, *supra*, 206 n.3.

Besides differentiating between class and individual characteristic, firearm examiners must also distinguish between subclass characteristics and individual characteristics. In toolmarks, subclass characteristics emerge when tool makers mass produce groups of tools which are similar in appearance, size, or surface finish. The toolmarks generated by tools in a given batch have corresponding microscopic characteristics, called subclass characteristics.[35] Subclass

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[35]See, e.g., Green, 405 F.Supp.2d at 111("Subclass characteristics are markings that temporarily become part of the manufacturing process and therefore create a marking on perhaps hundreds of weapons in a given production run, though they are not a permanent feature of the design. In effect, sub-class characteristics indicate an imperfection in the method used to produce a limited number of firearms."); Monteiro, 407 F.Supp.2d at 360("Subclass characteristics appear on a smaller subset of a particular make and model of a [tool]. They are 'produced incidental to manufacture' and 'can arise from a source which changes over time.' Subclass characteristics, then,

characteristics "can be suspected of being found on similarly manufactured tool working surfaces." Biasotti & Murdock, *supra*, at 212. As a result, the "toolmark examiner must be alert to the possibility that evidence may have been produced by a tool working surface having subclass characteristics" Id. at 210; see also Green, 405 F.Supp.2d at 112 n.14 ("The first time an examiner observes a particular sub-class characteristic, he may assume it is an individual characteristic.").

The commonness of subclass characteristics leads to the unsettling reality that the manufacturing process creates only a limited number of tools with sufficiently differentiated surfaces which can produce so-called toolmarks with individual characteristics. Furthermore, "as tool manufacturers minimize the steps necessary to produce tools in an effort to become more efficient and economical, the possibility for tools produced with similar characteristics increases." Stephanie J. Eckerman, *A Study of Consecutively Manufactured Chisels,* 34 Ass'n Firearms & Tool Mark Examiners J. 379, 380 (2002).[36] Moreover, while subclass characteristics may morph into individual characteristics with extended usage, studies have demonstrated that subclass and individual characteristics can appear in tandem with one another thereby making the

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may be present on a group of guns within a certain make or model, such as those manufactured at a particular time and place.").

[36]Professor Rowe provides an actual illustration of such an occurrence:
For example, a screwdriver used in a series of break-ins was found to have a pattern of striations on the side of the blade and ripple marks on the face of the blade. These features matched marks left at the crime scenes. However, the forensic tool mark examiner discovered that screwdrivers of the same brand and size purchased at local hardware stores exhibited the same features. The striation pattern of the side of the blade and the ripple marks were produced by the die used to stamp out the blades of the screwdriver. (Rowe, *supra*, at 352). See also David Q. Burd & Allan E. Gilmore, *Individual and Class Characteristics of Tools*, 13 J. Forensic Sci. 390 (1968) (describing another instance where different mass-produced tools created identical toolmarks).

identification process even more convoluted. See Jerry Miller, *An Examination of the Application of the Conservative Criteria for Identification of Striated Toolmarks Using Bullets Fired from Ten Consecutively Rifled Barrels*, 31 Ass'n Firearms & Tool Mark Examiners J. 125, 128 (2001) (finding both subclass and individual characteristics on the striated markings on both land and groove impressions of bullets fired by used guns). Consequently, examiners can easily make a false positive identification because "some machining processes are capable of reproducing remarkably similar surface characteristics (i.e., gross contour and/or fine striae, etc.) on the working surfaces of many consecutively produced tools which if not recognized and properly evaluated could lead to a false identification." Biasotti & Murdock, *supra*, at 17 (emphasis added).[37]

In terms of raw numbers, Professor Schwartz has written:

> The significance of these problems is illustrated by findings that up to 25% of the striae in toolmarks made by different screwdrivers of the same brand matched, while the percentage increased to 28% when comparing toolmarks made by different bolt cutters of the same brand. Similarly, in a classic, statistical empirical study in 1955, Alfred A. Biasotti found that 15 to 20% of the striae on bullets fired from different .38 Special Smith & Wesson revolvers matched.

Adina Schwartz, *A Systemic Challenge to the Reliability and Admissibility of Firearms and Toolmark Identification*, 6 Colum. Sci. & Tech. L. Rev. 2 (2005). See also, Declaration of Adina Schwartz, p. 16 ("As a result of the overlap individual characteristics of the toolmarks made by different tools, misidentifications may result because examiners assume that a certain amount of resemblance proves that the same tool produced both test and evidence toolmarks, when the

[37]As a result, toolmark examiners must "be familiar with the various forming and finishing processes in order to distinguish those… surface characteristics that are truly individual from those surface characteristics that may characterize more than one tool." Id.

same amount of resemblance is possible between toolmarks produced by different tools.")

As Judge Gertner explained: "There is no question that there are many marks on [toolmarks]... But even assuming that some of these marks are unique to the [tool] in question, the issue is their significance, how the examiner can distinguish one from another, which to discount and which to focus on, how qualified he is to do so, and how reliable his examination is." Green, 405 F.Supp.2d at 110. Besides identifying the fundamental issue in toolmark examination, Judge Gertner also commented on just how difficult it is for firearms examiners–novice and experienced–to distinguish between class, subclass, and individual characteristics. According to Judge Gertner:

> The task of telling them apart is not an easy one: Even if the marks on all of the [tools] are the same, this does not necessarily mean they came from the same [tool]. Similar marks could reflect class or subclass characteristics, which would define large numbers of [tools] manufactured by a given company. Just because the marks on the [tools] are different does not mean that they came from different [tools]. Repeated [usage], particularly over a long period of time, could produce different marks as a result of wear or simply by accident. Green, 405 F.Supp.2d at 107(emphasis in original).[38]

Judge Saris made the some observation in Monteiro:

> A recent article has highlighted the complexity of comparing patterns because of the difficulty in distinguishing between class, subclass, and individual characteristics, noting that a firearm "may be wrongly identified as the source of a

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[38]See, e.g., Rowe, *supra*, at 349 ("The individual characteristics of the tool may be more difficult to discern in compression tool marks... Sliding toolmarks are created when a tool slides along a surface; such marks usually consist of a pattern of parallel striations. Class characteristics are more difficult to determine from sliding tool marks. For example, screwdrivers, chisels, and pry bars could all make very similar sliding marks."); Burd & Gilmore, *supra*, at 395-396 ("Distinguishing between certain types of class and individual characteristics of tools can be rather difficult in some instances, and for this reason care must be taken in interpreting laboratory examinations of tool marks... In all cases [the toolmark examiner] must make a careful examination of the tools involved. In tool examinations care must be taken to accurately distinguish between class structure and individual characteristics.").

> toolmark it did not produce if an examiner confuses subclass characteristics shared by more than one tool with individual characteristics unique to one and only one tool. Monteiro, 407 F.Supp.2d at 363(citing Schwartz, *supra*, at 8).

Furthermore, recent testimony from firearms examiners raises the issue of whether firearms examiners actually understand and can differentiate between individual, class, and subclass characteristics in practice.[39]

Additionally, the task is made even more tedious because the leading toolmark organization, AFTE, has failed to articulate any standards which could assist fledgling and veteran firearm examiners in distinguishing between these different types of characteristics. Judge Saris highlighted this "critical problem" in Monteiro:

> one critical problem with the AFTE Theory [of toolmark identification] is the lack of objective standards for deciding whether a particular mark is a subclass or individual characteristic... Special Agent Curtis added that the AFTE Theory offers no guidance on telling the difference between subclass and individual characteristics... there is no generally accepted standard for distinguishing between class, subclass, and individual characteristics.

Monteiro, 407 F.Supp.2d at 371-372.

See also, Declaration of Adina Schwartz, p. 25 ("The danger that misidentifications will result from confusing subclass with individual characteristics is particularly great because firearms and toolmark examiners have not arrived at either strict rules for determining whether a microscopic pattern on a toolmark is an individual or a subclass characteristic or strict rules as to which tools or manufacturing processes do or do not produce toolmarks with subclass

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[39] In a March 2005 federal trial, a Boston Police Department examiner testified he had not doubt four cartridge cases recovered from a crime scene were fired from a specific Astra pistol in evidence "because they all shared the same similarities, class characteristics." In a 2000 federal trial, another BDP examiner testified that, as a rule, he declared a match if all he had was a single class characteristics. According to the examiner, "If that was all that I had (a single class characteristic), yes, I would call that a match." David S. Bernstein, *Bad ballistics: Hundreds of people have gone to prison on the word of Boston's untrained, unqualified, unskilled firearms examiners*, The Boston Phoenix, Oct. 7-13, 2005.

characteristics.")

Finally, notwithstanding the fact that firearm examiners are (and have been) well aware of the dangers and difficulties involved in distinguishing between subclass and individual characteristics, the field, as a whole, has been lethargic at conducting research to minimize these dangers. As Professor Schwartz has highlighted in her article:

> Despite their knowledge of this variation,... toolmark examiners have not formulated any generalizations or statistics about which types of tools can be expected to produce toolmarks with subclass or individual characteristics when they are newly manufactured. Nor have they developed statistics or generalizations about the rate(s) at which subclass characteristics on toolmarks produced by various types of tools can be expected to be replaced and/or joined by individual characteristics... toolmark examiners have also failed to develop any rules for distinguishing between subclass and individual characteristics. To avoid confusing subclass characteristics shared by more than one tool with individual characteristics unique to one and only one tool, examiners can only rely on their personal familiarity with types of forming and finishing processes and their reflections in toolmarks.
> Schwartz, *supra*, n.1 at 9.

In effect, then, "to decide if something could be a sub-class or class characteristic, [a firearm examiner] just compares the image in front of him to what he remembers from all those previous exams." Green, 405 F.Supp.2d at 112; see also id. at 108 ("In distinguishing class and sub-class characteristics from individual ones, O'Shea had little upon which to rely. There are reference works that discuss some of the known class and subclass characteristics but 'most of the time' an examiner would be deciding whether a mark was an individual versus sub-class or class characteristic on his own").

Once more, because this is an empirically testable proposition, Daubert and Kumho Tire mandate that the Government present empirical research which demonstrates firearm examiners are highly proficient at distinguishing between class, subclass, and individual

characteristics. Moreover, the Government's firearm expert cannot circumvent this requirement by simply making the bald assertion that he can identify a subclass characteristic or individual characteristic when he sees it. See United States v. Lewis, 220 F.Supp. 548, 553 (D.W.Va.) (the Government's handwriting expert's "bald assertion that the 'basic principle of handwriting identification has been proven time and time again through research in [his] field,' without more specific substance, is inadequate to demonstrate testability and error rate.").[40] As section IV will demonstrate, the Government cannot meet this burden.

IV. Arguments

A. The Government Has Failed To Meet Its Burden Under Rule 702

1. Testability Equates to Scientific Testing, Not Adversarial Testing

A key factor in the Daubert analysis is whether the theory and/or technique, which an expert's testimony is premised on, "can be (and has been) tested." Daubert, 509 U.S.. at 593. As Supreme Court noted: "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry." Id. (citation omitted).

As this passage plainly implies, Daubert refers to scientific testing rather than adversarial

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[40] See also United States v. Glynn, 578 F. Supp. 2d at 571 ("Although ballistics examiners continue to assert, as do their manuals and literature, that 'scientific principles' underlie the field, neither of the Government's witnesses in Glynn and Brown was able to identify those principles..... The Court suspects that they consist of no more than those elementary principles of physics that govern the transfer of impressions to a bullet and casing when a gun is fired.");Ramirez, 810 So.2d at 844 ("A bald assertion by the expert that his deduction is premised upon well-recognized scientific principles is inadequate to establish its admissibility..."); Jerry Miller & Michael McLean, *Criteria For Identification of Toolmarks*, 30 Ass'n Firearm & Toolmark Examiners J. 15, 20 (1998) ("In light of recent court decisions... it is no longer acceptable to state, 'I know it when I see it.'").

testing. This is an important distinction because the Government has made this argument in fingerprinting cases. See, e.g., United States v. Crisp, 324 F.3d 261 (4th Cir. 2003); United States v. Havvard, 117 F.Supp.2d 848 (S.D.Ind. 2000); United States v. Cline, 188 F. Supp. 2d 1287, 1294 (D. Kan. 2002). Remarkably, the Government's argument has actually been successful in some of these cases, even though Daubert's reference to scientific testing is quite explicit. See, e.g., United States v. Havvard, 260 F.3d 597, 601 (7th Cir.2001) ("fingerprinting techniques have been tested in the adversarial system").[41]

As Judge Pollack correctly explained in Llera Plaza, "If 'adversarial' testing were the benchmark [for judging scientific evidence]... then the preliminary role of the judge in determining the scientific validity of a technique would never come into play. Thus, even 100 years of 'adversarial' testing in court cannot substitute for scientific testing." United States v. Llera Plaza, 179 F.Supp.2d 492, 506 (E.D.Pa. 2002). Judge Pollack's reasoning was reinforced by Judge Michael of the Fourth Circuit Court of Appeals:

> Nor is fingerprint and handwriting analysis necessarily reliable because it has been subjected to the adversarial process of litigation. In a criminal case like this one, adversarial testing simply means that the defense lawyer cross-examines the government's expert. That, I concede, is important, but it only goes part way... Our adversarial system has much to commend it, but it is not a general substitute for the specific *Daubert* inquiry. The system without *Daubert* did not work to ensure the reliability of fingerprint and handwriting analysis. Crisp, 324 F.3d at 272-73 (Michael, J. dissenting).

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[41] See also Crisp, 324 F.3d at 268 ("While the principles underlying fingerprint identification have not attained the status of scientific law, they nonetheless bear the imprimatur of a strong general acceptance, not only in the expert community, but in the courts as well."); Cline, 188 F. Supp.2d at 1294 ("Used successfully in criminal trials for over 100 years, fingerprint identification analysis has withstood the scrutiny and testing of the adversarial process.");Cole (More Than Zero), *supra*, at 1210-1211 ("Aside from the fingerprint examiner's fallacy, the most commonly advanced argument is the following: that casework amounts to validation studies. That is, each time a fingerprint examiner offers a conclusion of identification in a real-life case, it is a scientific test of the accuracy of that conclusion.")

The Massachusetts Supreme Judicial Court has also held that "adversary testing is not what the Supreme Court meant when it discussed testing as an admissibility factor. Concluding that a test is reliable merely because testimony based on its results can be cross-examined in front of a jury puts the cart before the horse." Commonwealth v. Patterson, 445 Mass. 626, 651, 840 N.E.2d 12 (Mass. 2005). See also, United States v. Glynn, 578 F. Supp. 2d at 574 ("Although effective cross-examination may mitigate some of [the] dangers [of scientifically misleading firearm examination testimony], the explicit premise of Daubert and Kumho Tire is that, when it comes to expert testimony, cross-examination is inherently handicapped by the jury's own lack of background knowledge, so that the Court must play a greater role, not only in excluding unreliable testimony, but also in alerting the jury to the limitations of what is presented.")

Contrary to forensic examiners and certain courts, the criminal justice system's adversarial structure is not the proper forum to distinguish between valid and invalid forensic methodologies.

As Professor Peterson explained:

> Only a small percentage of the cases in any jurisdiction go to trial, so the technicians or scientists in the crime laboratories seldom are called upon to justify their procedures or conclusions under rigorous cross-examination. I think the realization that their work will not be reviewed—either by independent scientist or by opposing counsel and expert in court—decreases the care and completeness with which examiners process evidence.

Symposium on Science and the Rules of Legal Procedure, 101 F.R.D. 599, 643 (1984) (remarks of Professor Joseph Peterson).

The NAS 2009 Report put the matter more bluntly:

> The adversarial process relating to the admission and exclusion of scientific evidence is not suited to the task of finding "scientific truth." The judicial system is encumbered by, among other things, judges and lawyers who generally lack the scientific expertise necessary to comprehend and evaluate

> forensic evidence in an informed manner, trial judges (sitting alone) who must decide evidentiary issues v
> and often with little time for extensive research and reflection, and
> the highly deferential nature of the appellate review afforded trial courts' Daubert
> rulings. Given these realities, there is a tremendous need for theforensic science
> community to improve. Judicial review, by itself, will not cure the infirmities of
> the forensic science community.

(NAS 2009 Report, p. 12)

Moreover, various forensic techniques have little relevance outside the criminal investigation and courtroom context. This limited applicability considerably reduces the chances that the technique's methodology will be subjected to scientific scrutiny. See Daubert v. Merrell Dow Pharmaceuticals, 43 F.3d 1311, 1317 n.5 (9th Cir. 1995) ("Fingerprint analysis, voice recognition, DNA fingerprinting and a variety of other scientific endeavors closely tied to law enforcement may indeed have the courtroom as a principal theatre of operations."); Smith & Goodman, *supra*, at 233. Likewise, the nature of forensic determinations are such that "the forensic scientist does not put his results to a scientific use that would invariably show the limitations and liabilities, if any, of the procedures." Randolph N. Jonakait, *Will Blood Tell? Genetic Markers In Criminal Cases*, Emory L.J. 833, 851 (1982).[42]

Accordingly, the Government has the burden of establishing that the underlying premises of firearm and shell casing identification are not only testable, but that they have been appropriately tested using legitimate scientific methods.

2. The Uniqueness Proposition Supporting Firearm Identification Is Unfalsifiable

Science does not attempt to prove a proposition's legitimacy. Instead, science

[42]This issue will be discussed in more detail infra.

attempts to falsify the proposition. See, e.g., Karl Popper, The Logic of Scientific Discovery 40-41, 42 (1980); Karl Popper, Conjectures and Refutations: The Growth of Scientific Knowledge 37 (5th ed. 1989) It was the falsification concept which garnered the greatest amount of attention and confusion in Daubert.[43] A "proposition is 'falsifiable' if it is 'capable of being proved false; defeasible.'" United States v. Mitchell, 365 F.3d 215, 235 (3rd Cir. 2004) (citation omitted). Falsifiability is necessary because "a scientific hypothesis...[can] never be proved conclusively true because there is always the possibility that the observations relied upon were coincidental rather than causal." Michael Green, *Expert Witness and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Benediction Litigation*, 86 Nw U. L. Rev. 643, 645 (1993).[44] Moreover, while empirical testing can establish the falsehood of a universal statement, a universal statement "can never be proven true by virtue of the truth of particular statements, no matter how numerous." Burt Black et al., *Science and the Law in the Wake of Daubert: A New Search For Scientific Knowledge*, 72 Tex. L. Rev. 714, 755 (1994) If the demarcation between science and other areas of human inquiry (i.e., nonscience) is falsification, firearm identification cannot constitute science because the theory of individuality is neither testable nor falsifiable. According to two forensic scientists:

Most laypersons, and perhaps even a majority of scientists, accept the concept of uniqueness

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[43] See, e.g., Daubert, 509 U.S. at 593 ("Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry." (citation omitted); id. at 600 (Rehnquist, C.J., concurring) ("I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its 'falsifiability,' and I suspect some [federal judges] will be, too.").

[44] See also Randolph N. Jonakait, *The Assessment of Expertise: Transcending Construction*, 37 Santa Clara L. Rev. 301, 324 (1997) ("Falsifiability is demanded because in an inductive world a proposition can never be definitively proved.").

> at face value. It is imperative to appreciate that this view... constitutes a leap of faith. Our belief that uniqueness is both attainable and existent is central to our work as forensic scientists. But we must be clear that it is a belief, not a fact. Not only has it not been proved, it is unprovable. In the language of science, the theory of uniqueness is not falsifiable.

(Inman & Rudin, *supra* at 123 (emphasis added)). See Michael J. Saks & Jonathan J. Koehler, *What DNA "Fingerprinting" Can Teach The Law About the Rest of Forensic Science*, 13 Cardozo L. Rev. 361, 368 n.28 (1991) ("To demonstrate the assumption that gun barrel markings disperse themselves evenly, one would have to compare the markings of each gun barrel with every other gun barrel that ever existed or ever will exist.").[45]

While the theory of individuality is not testable or falsifiable, firearm examiners have had (and continue to have) the capacity to research the readily testable proposition of how frequently a specific feature, attribute, or pattern occurs in the general population of various firearms. The results of such an endeavor would produce some sort of database comparable to the genetic databases utilized in DNA testing. Firearm examiners, like other forensic identification examiners (besides DNA), have yet to conduct this type of discriminatory research. See Biasotti & Murdoch, *supra*, 216-217. Likewise, they have had (and continue to have) ample time to empirically test the claim that firearm examiners are so uniquely trained and skilled that they are capable of distinguishing between class, subclass, and individual characteristics thus giving them the ability to accurately match firearm or shell casing markings to the one and only weapon which could have produced the marks. This research is also non-existent. See id. at 218-219 ("forensic science researchers have not

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[45] See also Bernard Robertson & G.A. Vignaux, Interpreting Evidence: Evaluating Forensic Science in the Courtroom 4 (1995) ("It seems impossible to design an experiment to refute" individuality); Randolph N. Jonakait, *Real Science and Forensic Science*, 1 Shepard's Expert & Sci. Evid. 435, 436 n.8 (1994); Michael J. Saks, *Implications of the Daubert Test for Forensic Identification Science*, 1 Shepard's Expert & Sci. Evid. Q. 427, 429 (1997).

managed to calculate [error rates] for the forensic specialities like firearm and toolmark identification comparison that depend in part on subjective judgment.").[46]

According to the NAS 2009 Report, "the decision of the toolmark examiner remains a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates." Report at 151. "Forensic science reports, and any courtroom testimony stemming from them, must include clear characterizations of the limitations of the analyses, including associated probabilities where possible. ... In order to enable this, research must be undertaken to evaluate the reliability of the steps of the various identification methods and the confidence intervals associated with the overall conclusions." Id. at 186.

The Ballistics Imaging Report concluded that:

> *Conclusions drawn in firearms identification should not be made to imply the presence of a firm statistical basis where none has been demonstrated.* Specifically, ... examiners tend to cast their assessments in bold absolutes, commonly asserting that a match can be made 'to the exclusion of all other firearms in the world.' Such comments cloak an inherently subjective assessment of a match with an extreme probability statement that has no firm grounding and unrealistically implies an error rate of zero.

Exhibit 5 at 82.

See also United States v Glynn, 578 F.Supp.2d 567, 571 (S.D.N.Y. 2008) (concluding that firearms

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[46] Mr. McCluskey has asked for, and the government just recently produced on April 20, 2012, any proficiency tests administered to the firearm examiner in this case. A total of only two such tests were produced and they are both non-blind and both involve undamaged bullet comparisons, not cartridge comparisons, or comparison of damaged bullets. The failure of the government to produce evidence of blind and realistic proficiency testing to demonstrate acceptable error rates should weigh heavily in favor of excluding the firearms evidence in this case. See, *United States v. Mitchell*, 365 F. 3d 215, 246 (3rd Cir. 2004)("[D]istrict courts will generally act within their discretion in excluding testimony of recalcitrant expert witnesses-those who will not discuss on cross-examination things like error rates or the relative subjectivity or objectivity of their methods.")(fingerprint case).

and toolmark identification "lacked the rigor of science and that, whatever else it might be, its methodology was too subjective to permit opinions to be stated to 'a reasonable degree of ballistic certainty'"); United States v. Willock, 696 F.Supp.2d 536 (D.Md.2010)(same).

Consequently, if the theory of individuality is unfalsifiable and the firearm profession has yet to produce any databases which could produce DNA-like probabilities as to how likely it is a specific weapon created a specific bullet or shell casing mark, then we are back at square one because all a firearm examiner can truly say (or speculate) is, "I know a match, when I see a match." This type of (so-called) scientific or technical testimony, which is based entirely on the ipse dixit of the expert, is what Daubert, Joiner, and Kumho Tire intended to prohibit. See, e.g., Joiner, 522 U.S. at 146 ("nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the ipse dixit of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.") (emphasis in original).[47]

3. Toolmarks And Firearms Are Not Unique Nor Are They Permanent

With respect to uniqueness, certain objects may generate patterns, impressions, or striations which can be deciphered with limited difficulty while others, namely mass-produced products, tend to create little, if any, distinctive markings. For instance, the intensity of variation witnessed in fingerprints (minutiae) supposedly enables qualified fingerprint examiners to readily distinguish between two or more complete prints. See, e.g. United States v. Llera Plaza, 179

[47]See also Kumho Tire, 529 U.S. at 157; Kannankeril v. Terminix Int'l, 128 F.3d 802, 806 (3d Cir. 1997); United States v. Van Wyk, 83 F. Supp.2d 515 (D.N.J. 2000).

F.Supp.2d 492 (E.D.Pa. 2002) ; United States v. Mitchell, 365 F.3d 215 (3rd Cir. 2004).

Conversely, consider such objects as mass-produced tools (paints and firearms). Given the modern manufacturing methods, there is simply no basis for the assumption, fundamental to toolmark and firearm identification, that the manufacturing process implants "distinctive" or "unique" markings onto each and every tool or weapon. Remarkably, criminalists and toolmark examiners have been aware of this critical fact for decades. For instance, three decades ago Paul Kirk wrote:

> Most manufacturing methods gave to the product a reasonable degree of individuality when new. This has become less true in recent times. It has been noted... that many cheap tools that are... [mass produced] are now almost identical when first sold. Numerous high-grade tools, which are not changed by use, are now being produced by extremely hard cutting-and-broaching equipment that needs to pass the edge only once. Thus it is expected that increasing difficulty may be encountered in establishing individuality among tools that have been made with the same machine tool.

Paul L. Kirk, Crime Investigation 2d.1974, *supra*, at 363.

Professor Rowe has reiterated Professor Kirk's comments, while at the same time adding a word of caution for the inattentive toolmark examiner:

> Many modern manufacturing techniques can produce tools that when new do not possess sufficient individual characteristics to permit the tool marks they make to be distinguished from one another. Occasionally what appear to be individual characteristics on a tool are found to be class characteristics.

(Rowe, *supra*, at 351-352 (emphasis added).[48]

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[48]Professor Schwartz wrote:

> By contrast to these well-established generalizations about the uniqueness of fingerprints and nuclear DNA and the sharing of mtDNA sequences in people descended from the same maternal line, only some manufacturing processes produce individual tools with sufficiently differentiated surfaces to produce toolmarks with individual characteristics. Other manufacturing processes result in batches of such similar tools that their toolmarks have the same subclass characteristics, and may or may not also have individual characteristics. (Schwartz, *supra*, at 7; see also Burd & Gilmore, *supra*, at 390-391 ("That some...

In essence, the manufacturing process has completely undermined the uniqueness assumption which is critical for toolmark and firearm identification.

Toolmark identification, like all other forensic identification fields, also relies on the assumption tools maintain their uniqueness throughout their lifetime. While this assumption may be true for fingerprinting, see United States v. Llera Plaza, 188 F.Supp.2d 549, 551 (E.D.Pa. 2002) (judicially noticing the permanence of fingerprints), and DNA, see David H. Kaye & George F. Sensabaugh Jr., *The Scientific Status of DNA Typing, in* Science in the Law: Forensic Science Issues David L. Faigman et al. eds. 2002), the same cannot be said for toolmark or firearms identification). See, e.g., Dijk, *supra*, at 1219-1220; Kirk, Crime Investigation, *supra*, at 373-374.

Tools, including firearms , will undoubtedly be altered by the wear and tear of repeated usage.[49] This deterioration of the tool's surface affects whether it can continually produce the identical distinctive features which are essential if a firearm examiner is to individualize a bullet or shell casing mark to a specific weapon. When the permanence assumption is called into question,

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manufacturer's markings on tools are types of class characteristics is obvious to the examiner, but certain types of structure can resemble accidental characteristics which actually are not at all unique.")).

[49]See Dijk, *supra*, at 1219-1220 ("The working edges of many implements are subject to corrosion, wear and abuse. As such, the individual characteristics (on the implement itself), on which an individualization must be based, can be destroyed shortly after the scene impression is deposited... Unlike fingerprint and DNA evidence... toolmark evidence has limited classification value and also usually has a limitation of time. Many crime laboratories discard their unidentified toolmark evidence... after 6 months."); Kirk, *supra*, at 373-374 ("Wear on a tool edge will change its marking slowly but progressively. A worn tool is more individual than a new tool. Hence, more reliable results are obtainable from tools that are worn, provided that the wear pattern has not been altered significantly between the making of a questioned tool mark and the making of the standard mark to be used for comparison. It is not always possible to obtain matching patterns when a questioned tool has been in regular use between the making of the two marks.").

though, the examiner's task is made that much more difficult. For instance, if certain striations correspond while others do not, the examiner is left questioning whether wear and tear caused the dissimilarities or whether the suspected waepon actually created the striation . In the end, the only thing the examiner can base his identification on is his subjective "gut feeling" that he or she knows a match, when he or she sees a match.

The lack of permanence has played a significant factor in the handwriting and firearms identification cases. For instance, a key reason why Judge Gertner limited the Goverment's firearms expert's testimony in Green was because "[i]ndividual marks [on the inner chamber of a firearm] may change over time." Green, 405 F.Supp.2d at 112 n.13. The "examiner's task is further complicated by the fact that an individual gun's markings change over time; marks present at one period may not be there at another... ." Id. at 111.

With respect to the handwriting cases, Judge Gertner highlighted the lack of permanence as one of several reasons why she prohibited the Government's expert from offering an opinion as to authorship. Judge Gertner wrote:

> unlike DNA or even fingerprints, one's handwriting is not at all unique in the sense that it remains the same over time, or uniquely separates one individual from another. Everyone's handwriting changes from minute to minute, day to day.... Given that variability, the 'expert' is obliged to make judgments–these squiggles look more like these, these lines are shaped more like these, etc. And those judgments are, as Harrison conceded, *subjective*.

(Hines, 55 F.Supp.2d, at 69 (emphasis added).

Adhering to Judge Gertner's reasoning in Hines, many district courts limited what handwriting experts could attest to in court given this fundamental drawback of handwriting identification.[50]

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[50]See, e.g., United States v. Oskowitz, 294 F.Supp.2d 379, 883-884 (E.D.N.Y. 2003); United States v. Rutherford, 104 F. Supp.2d 1190 (D.Neb. 2000); United States v. McVeigh, 1997 WL 47724 (D.Colo. Trans. Feb. 5, 1997); United States v. Santillan, 1999 U.S. Dist. LEXIS 21611 (N.D.Cal. Dec. 3, 1999); United States v. Van Wyk, 83 F. Supp.2d 515 (D.N.J. 2000); United

The NAS 2009 Report concludes that "[w]ith the exception of nuclear DNA analysis...no forensic method 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." Report, p. 7. The Report made it clear that these criticisms extend to firearms and toolmark identification:

> Toolmark and firearms analysis suffers from the same limitations [as other types of] impression evidence. 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. ...
>
> A fundamental problem with toolmark and firearms analysis is the lack of a precisely defined process [for reaching identification conclusions]. ...
>
> ... Overall, the process for toolmark and firearms comparison lacks the specificity of the protocols for, say, 13 STR DNA analysis. This is not to say that toolmark analysis needs to be as objective as DNA analysis in order to provide value. ... But the protocols for DNA analysis do represent a precisely specified, and scientifically justified, series of steps that lead to results with well-characterized confidence limits, and that is the goal for all the methods of forensic science.

Id. at 154-155.

With the uniqueness and permanence assumptions both completely undermined, it is obvious that any firearm testimony, which is premised on these faulty assumptions, will itself be faulty. This fact renders firearm identification inadmissible under Daubert, as the methodology used by toolmark examiners is inherently defective (and subjective) due to the invalidity of the uniqueness and permanence assumptions. As the Supreme Court stressed in Daubert, the appropriate focus

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States v Hidalgo, 229 F. Supp.2d 961 (D.Ariz. 2002); United States v. Fujii, 152 F. Supp.2d 939 (N.D.Ill. 2000); United States v. Saelee, 162 F. Supp.2d 1097 (D.Alaska 2001) (excluding all testimony by a handwriting expert); United States v. Brewer, 2002 U.S. Dist. LEXIS 6689 (N.D.Ill. 2002) (also excluding all handwriting expert testimony).

regarding admissibility is "not the correctness of the expert's conclusions but the soundness of the methodology." Daubert v. Merrell Dow Pharms., Inc., 43 F.3d 1311, 1318 (9th Cir. 1995); see also Daubert, 509 U.S. at 595 ("The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate.").

4. The Government Cannot Establish Firearms Leave Equally Distinctive Traces of Themselves In Any Environment and on Any Surface

Even if the uniqueness assumption were true (which it is not), the Government, pursuant to Kumho Tire, must still present evidence that this alleged uniqueness can be and is always transferred to another object or surface when some sort of contact is made. Simply stated, the Government has the daunting responsibility of establishing the validity of Locard's Theory of Exchange (or Transfer) as it relates to firearm identification.[51]

The Government cannot meet its burden because Locard's Theory, in general, has yet to be tested or refuted by any forensic professionals. See Inman & Rudin, *supra*, at 94. It goes without saying, then, if Locard's Theory, in general, has yet to be tested and thus empirically supported, its application to firearms identification is also unsupported empirically. Consequently, this is just another link in the firearm expert's chain of reasoning which has been thoroughly debunked. As a result, this factor goes directly to the heart of the Supreme Court's opinion in Daubert because any opinion rendered using this defective reasoning will be unsound and unreliable. See United States v. Nacchio, 555 F. 3d 1234, 1241 (10th Cir. 2009)(en banc)

(" 'Under Daubert, any step that renders the expert's analysis unreliable ... renders the expert's

[51] See Edmond Locard, *The Analysis of Dust Traces*, 1 Am. J. Police Sci. 276 (1930) (describing Locard's Theory); Edmond Locard, *The Analysis of Dust Traces*, 1 Am. J. Police Sci. 401 (Second Part) (1930) (same).

testimony inadmissible. This is true whether the step completely changes a reliable methodology or merely misapplies that methodology.'"), quoting Mitchell v. Gencorp Inc., 165 F.3d 778, 782 (10th Cir.1999); In re Paoli R.R. v. Yard PCB Litig., 35 F.3d 717, 745 (3rd Cir. 1994) ("Daubert's requirement that the expert testify to scientific knowledge–conclusions supported by good grounds for each step in the analysis–means that any step that renders the analysis unreliable under the Daubert factors renders the expert's testimony inadmissible."); Rider v. Sandoz Pharmaceutical Corp., 295 F.3d 1194, 1197 (11th Cir. 2002) (under Daubert and Kumho Tire, the focus must be on "the kind of empirically supported, rationally explained reasoning required in science.").

5. The Firearms Profession Has Yet To Develop Any Error Rates

When it comes to forensic identification evidence, perhaps the most important Daubert factor this Court must consider is whether the firearm community, specifically, or the forensic science community, generally, has conducted research to ascertain the accuracy (or inaccuracy) of its examiners. See Daubert, 509 U.S. at 594; Kumho Tire, 526 U.S. at 151. As Judge Rakoff has written: "False positives–that is, inaccurate incriminating test results–are endemic to much of what passes for 'forensic science'... Even the 'gold standard' of forensic testing, DNA tests, may, because of human error, prove fallible." United States v. Bentham, 414 F. Supp. 2d 472, 473 (S.D.N.Y. Feb. 17, 2006).

Notwithstanding the methodological flaws of toolmark identification, these defects could be minimized if the toolmark profession presented evidence to the jury which demonstrates that, although their technique may be imperfect, they are still capable of accurately linking striation marks to weapons. As Judge Gertner explained in Green:

> The Court and ultimately the jury could still evaluate the testimony by considering the error rates in the field and the error rates for this examiner. In other words, even if his approach

> may be flawed, if examiners in the field manage to overcome those flaws, or if this examiner had a low error rate, the evidence may still be reliable, and the jury can evaluate it.

Green, 405 F.Supp.2d at 121.

Neither the firearm community, specifically, nor the forensic science community, generally, has ever conducted double-blind independent proficiency testing aimed at ascertaining the accuracy (or inaccuracy) of firearm examiners. See Biasotti & Murdoch, *supra*, at 215-216.

Toolmark examiner's try to rationalize this lack of research by naively asserting that "toolmark identification, because the process is so subjective and qualitative, it 'is not possible to calculate an absolute error rate for routine casework.'" Monteiro, 407 F.Supp.2d at 367 (quoting Richard Grzybowski et al., *Firearm/Toolmark Identification: Passing the Reliability Test Under Federal and State Evidentiary Standards*, 35 Ass'n Firearm & Toolmark Examiners J. 209, 219) (2003); Alfred Biasotti & John Murdoch, *The Scientific Basis of Firearms and Toolmark Identification, in* 3 Modern Scientific Evidence 143 (David. L. Faigman et al. eds. 1997) ("Based on the present data, the [toolmark] field is in a poor position to calculate error rates."). The "it's impossible to conduct error rate research" argument in effect permits toolmark and firearm examiners to use anecdotal evidence to demonstrate their alleged proficiency. The Government's firearms expert did exactly this in Green:

> O'Shea estimated that he has done 'hundreds' of ballistics examinations in his career and testified in a similar number of cases. However, as described below, the record does not indicate how many of these 'hundreds' of examinations were accurate... The Court had to rely solely on his testimony that he had examined hundreds of casings and guns. In effect, the jury would have to trust in his observational capacities, without knowing how often he was actually correct.

Green, 405 F.Supp.2d at 122.

Firearm examiners cannot be permitted to use anecdotal evidence to bolster their claims of

proficiency because the nature of firearms identification is fundamentally different than all other scientific endeavors because it does not offer the examiner immediate feedback as to whether his or her conclusion or identification is correct.[52] Under the current system, if an examiner generates an inclusionary or favorable finding for the State, the State generally does not question the accuracy of this finding nor does it request additional testing to ensure the accuracy of the initial identification. See Ramirez v. State, 810 So.2d 836, 849 (Fla. 2001) ("Once a match is declared under his theory, no other knives are examined because an identification under this method purportedly eliminates all other knives in the world as possible sources of the wound."). Rather, it simply assumes its correctness and uses it to further bolster its case against the defendant. Even at trial, the accuracy of the examiner's findings may not be exposed if defense counsel is not well-versed in forensic evidence or cross-examining forensic experts. Thus, the accuracy of an examiner's identification may never surface. Not having access to clear-cut accuracy feedback has had devastating

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[52] See, e.g., D. Michael Risinger & Michael J. Saks, *Science and Nonscience in the Courts: Daubert Meets Handwriting Identification Expertise*, 82 Iowa L. Rev. 21, 33-34 (1996); Burt Black, *A Unified Theory of Scientific Evidence*, 56 Fordham L. Rev. 595, 635 (1988):

> Unlike hospitals that test undeteriorated, uncontaminated blood using established techniques designed to assure safe transfusions, crime labs have no way of knowing if they are right or wrong in finding a match based on deteriorated, contaminated blood samples examined with a technique developed by police scientists. In the hospital, patients would die if the blood test did not work, but complaints from innocent defendants cannot be distinguished from the protestations of the guilty.

Randolph N. Jonakait, *Will Blood Tell? Genetic Markers in Criminal Cases*, 31 Emory L. Rev. 833, 851 (1982)):

> [T]he forensic scientist does not put his results to a scientific use that invariably show the limitations and liabilities, if any, of the procedures. When the forensic laboratory classifies a blood sample's PGM into one of its genetic variants, this classification is not merely a research step upon which the forensic scientist or others will continue to build. The scientist's job conversely, ends with that categorization rather than putting these findings to any further use. Consequently, if for some reason the procedures to detect genetic markers in dried and aged blood falsely detect PGM "1" as "2-1," this incorrect result will not necessarily be discovered by any subsequent scientific use or practice.

consequences for many people and institutions. See Cooley, *supra*, Appendixes A-B (discussing wrongful capital convictions and questionable capital convictions which were caused in part by defective forensic evidence).

For example, consider airplane and harbor boat pilots. See United States v. Starzecpyzel, 880 F.Supp. 1027, 1029 (1995) (analogizing handwriting experts to harbor pilots who learn by experience). These pilots, like many other experts whose skills are practically applied exclusively outside the courthouse, undergo validation tests on a daily basis. Their criteria for assessing the accuracy of their professed skill is easily and instantly recognizable to not only the pilots but to those around them (i.e., their passengers). These pilots either successfully navigate their planes or harbor boats to their requested destination or they do not. Under these circumstances, error detection is rather simple.

Because errors are easily and instantly detected, airplane and harbor boat pilots can immediately study their mistakes and assimilate any new knowledge generated from these reflective endeavors rather quickly. Consequently, although their errors are publicly exposed, the immediate knowledge they acquire from studying their mistakes will only make them more proficient pilots in the future. The same goes for doctors. A doctor will immediately learn whether his or her diagnosis is inaccurate if her patient's symptoms do not dissipate after prescribing a certain medication or treatment. As a result, proficiency testing for medical doctors, like airplane and harbor boat pilots, is not critical. The firearm profession, however, cannot make such an argument.

No such clear-cut accuracy feedback exists under our present-day crime laboratory system, in general, or firearms field, in particular. The only information a firearm examiner can use to surmise whether his identification was accurate or inaccurate is the jury's vote. If a jury returns

with a guilty verdict, firearm examiners assume their identifications or conclusions were correct, while the converse is generally assumed if the jury acquitted the defendant. Under this format, if errors are made (and they are as the overturned and wrongful conviction cases clearly denote), see Saks & Koehler (Paradigm Shirt), *supra*, at 893-894, Cooley, *supra*, at 435-440, firearm examiners (and the entire forensic science community) are not afforded an opportunity to learn from their mistakes. Moreover, if errors do surface they typically do so years after the examiner's original identification. Consequently, regardless of whether the situation is the former (errors not identified) or the latter (errors identified, but only years down the road), the firearm examiner may continue to use the same procedure or technique for years to comes, even though this procedure or technique is error prone. Moreover, the examiner may simply be an incompetent examiner, but she and the public may not learn this until it is too late.

The firearm community's concession that it has yet to and cannot conduct proficiency research weighs heavily in favor of non-admissibility for several reasons.[54] First, because this type of error-rate evidence is non-existent the Government cannot definitively assert firearm examiners are highly accurate (or reliable) at linking a bullet to the one and only weapon which produced the marking. As a result, the Government cannot prove the reliability of firearm evidence and thus cannot satisfy Daubert.[55]

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[54]As Professor Saks explains, the question is: "'When people in your field offer opinions regarding this task, how accurate are they?' If the expert could not give an informative answer to such a question based on sound and adequate data–that is, if the expert's honest answer would have to be 'I don't know'–then the testimony is not helpful to the jury and is vulnerable to exclusion. Saks (Fingerprinting), *supra*, at 1170.

[55]See, e.g. Saelee, 162 F. Supp.2d at 1103 ("There is little known about the error rates of forensic document examiners. The little testing that has been done raises serious questions about the reliability of methods currently in use."); Williamson, 904 F.Supp. at 1558 (hair identification

Second, as Judge Gertner wrote: "Expert evidence should not be excluded merely because witnesses practicing in that field make errors with some frequency, but because the factfinder has no information about the likelihood of error in the opinions, and thus cannot adjust the weight to be given to the evidence." Green, 405 F.Supp.2d at 119(emphasis added). Without "information about error rates, the initial factfinder, this Court, and the ultimate one, the jury, have no accurate way of evaluating the testimony." Id. (emphasis added). If the court and jury are unable to accurately assess an expert's opinion and properly weigh it, then it goes without saying the information offered by the expert is of no assistance because the jury has no clue what to think of or do with this confusing (and highly prejudicial, see infra) information. As a result, this Court must exclude firearm testimony because it does not "assist the trier of fact to understand the evidence." Fed. R. Evid. 702; Daubert, 509 U.S. at 591; United States v. Oskowitz, 294 F.Supp.2d 379, 383 (E.D.N.Y. 2003).

Third, given the aura of infallibility attached to present-day forensic experts (thanks to shows like CSI), see Green, 405 F.Supp.2d at 109 (commenting on the "illusory perfection of [today's] television show[s]"), allowing the government's firearm expert to testify, despite the fact

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did not satisfy Daubert in part because the "court has found an apparent scarcity of scientific studies regarding the reliability of hair comparison testing."); Lewis, 220 F.Supp. at 553 (excluding handwriting testimony entirely under Daubert in part because Government's expert "did not know the relevant methodologies or the error rates" of handwriting identification); McVeigh, 1997 WL 47724 *3-4 (excluding a handwriting expert's ultimate opinion regarding authorship under Daubert in part "no verification-type testing" in handwriting); Hines, 55 Supp.2d at 69 (excluding a handwriting expert's ultimate opinion regarding authorship under Daubert in part because "[n]o one has shown me Harrison's error rate, the times she has been right, and the times she has been wrong."); United States v. Van Wyk, 83 F. Supp.2d 515, 522 (D.N.J. 2000) (excluding forensic stylistics identification under Daubert in part because "the Government has [not] been able to identify a known rate of error."); Green, 405 F.Supp.2d at 109 (excluding a firearms expert's ultimate opinion as to identification under Daubert in part because the "record [did]not indicate how many of these 'hundreds' of examinations [the Government's expert was] accurate"); Fujii, 152 F.Supp.2d at 940 (N.D.Ill. 2000) (completely excluding handwriting testimony under Daubert in part because the "potential rate of error is almost entirely unknown.").

she cannot produce any error rate data (i.e., no probative value), would be extremely unfair and would easily prejudice the defendant.[56] Judge Seay ruled in this manner when he learned that there was little, if any, error rate research regarding hair identification:

> Based in part on the hair expert's own testimony that there is no research to indicate with any certainty the probabilities that two hair samples are from the same individual, this court held that hair expert testimony was too speculative to be admissible. Admission of such testimony would have been 'extremely unfair' and could 'prejudice the defendants without any real probative value.' This court is not persuaded to change those conclusions. Williamson v. Reynolds, 904 F.Supp. 1529, 1558 (E.D.Okla. 1995); Daubert, 509 U.S. at 595.

As Judge Rakoff observed in Glynn, "The problem is compounded by the tendency of ballistics experts--such as those in Brown and Glynn--to make assertions that their matches are certain beyond all doubt, that the error rate of their methodology is 'zero,' and other such pretensions." 578 F. Supp. 2d at 574. Clearly, at least in this case, on this record, the firearm examiner evidence should be excluded under Rules 402 and 403, as well as under Daubert and Rule 702. Alternatively, the testimony should be limited, as it was in Glynn, so that the firearm examiner would be permitted to testify, if it is otherwise supportable, "only that a firearms match was 'more likely than not,' thereby satisfying Rule 401 without overstating the capacity of the methodology to ascertain matches." 578 F. Supp. 2d at 574-575. See also United States v. Willock, 696 F.Supp.2d at 547 (firearm expert will "not be allowed to opine that it is a 'practical impossibility' for any other firearm to have fired the cartridges other than the common 'unknown firearm' to which [he]

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[56] The first empirical study of the "CSI effect" has found that " [although the media warns that a 'CSI Effect' is seducing jurors into legally-unjustifiable 'not guilty' verdicts and unwarranted demands for proof of guilt beyond any and all doubt, the empirical results here suggest otherwise. If anything, the data hints that, if there is any effect of CSI, it is to exalt the infallibility of forensic evidence, favor the prosecution, or pre-dispose jurors toward findings of guilt." Kimberlianne Podlas, *"The CSI Effect": Exposing the Media Myth*, 16 Fordham Intell. Prop. Media & Ent. L.J. 429 (2006).

attributes the cartridges" and will "only be permitted to state his opinions and bases without any characterization as to degree of certainty").

a. Factors Which Indicate the Error Rate is Unacceptably High

Even though the firearm field is bankrupt when it comes to error rate research, this Court can look to other factors to ascertain whether firearm examiners are highly proficient matching a bullet or shell casing marking with the one and only weapon which could have created the mark.[57] These factors, as the Court will see, clearly call into question the professed accuracy of firearms examiners thereby rendering it inadmissible under Daubert and Rule 702.

(1). The Lack of Accuracy Feed Back Information

As discussed supra, that the nature of firearms examinations do not provide any immediate accuracy-related feed back is significant. Moreover, as will be discussed in greater detail infra, the peer reviewers who review a firearms examiners identification, if there are any to begin with, typically are friends and co-workers who know the conclusion of the first examiner and thus, like the initial examiner, are easily affected by examiner biases and observer effects.[58]

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[57] As Justice Blackmun noted in Daubert: "we do not presume to set out a definitive checklist or test." 509 U.S. at 593. Consequently, this Court may consider other relevant factors which may bear on the validity and reliability of the Government's toolmark expert's conclusions and techniques.

[58] As indicated above, this point was recently demonstrated when the FBI admitted that three of its fingerprint "experts" and one defense expert erroneously identified a latent print in the Madrid bombing case as belonging to an Oregon lawyer after the lawyer's print came up as the number 4 candidate of possible suspects generated by an AFIS computer search. According to the FBI's official version of these multiple misidentifications, they were caused because

> The power of the IAFIS match, coupled with the inherent pressure of working an extremely high-profile case, was thought to have influenced the initial examiner's judgment and subsequent examination. This influence was recognized as confirmation bias (or context effect) and describes the mind-set in which the expectations with which people approach a task of observation will affect their perceptions and interpretations of what they observe....
>
> Once the mind-set occurred with the initial examiner, the subsequent examinations

(2). Lack of Standards (Too Much Subjectivity)

Another factor indicating firearms identification is unreliable, is the lack of national standards and objective criteria for (a) distinguishing between class, subclass, and individual characteristics, and (b) declaring a match between a bullet or shell casing and a firearm. See Daubert, 509 U.S. at 594 ("in the case of a particular scientific technique, the court ordinarily should consider... the existence and maintenance of standards controlling the technique's operation").

b. No Standards for Distinguishing Between Class, Subclass, and Individual Characteristics

Before firearms examiners can even consider declaring a match, they must first be able to distinguish between class, subclass, and individual characteristics. Distinguishing between these three types of characteristics, however, is entirely subjective because the firearm community has not articulated any objective criteria which firearm examiners could reference while conducting their examinations. As Judge Gertner highlighted in Green: "In distinguishing class and sub-class characteristics from individual ones, [the Government's expert] did not have many resources to rely on. He conceded, over and over again, that he relied mainly on his subjective judgment. There were no reference materials of any specificity, no national or even local database on which he

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were tainted. Latent print examiners routinely conduct verifications in which they know the previous examiners' results without influencing their conclusions. However, because of the inherent pressure of such a high-profile case, the power of an IAFIS match in conjunction with the similarities in the candidate's print, and the knowledge of the previous examiners' conclusions (especially since the initial examiner was a highly respected supervisor with many years of experience), it was concluded that subsequent examinations were incomplete and inaccurate. To disagree was not an expected response. (Robert B. Stacey, Unit Chief, Quality Assurance and Training Unit, Federal Bureau of Investigation, Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case, ForensiC. Science Communication, Jan. 2005, Vol. 7, No. 1, available at http://www.fbi.gov/hq/lab/fsc/backissu/jan2005/special_report/2005_special_report.htm).

relied."Green, 405 F.Supp.2d at 108. Likewise, as Professor Schwartz has explained in her article:

> Despite their knowledge of this variation, firearms and toolmark examiners have not formulated any generalizations or statistics about which types of tools can be expected to produce toolmarks with subclass or individual characteristics when they are newly manufactured. Nor have they developed statistics or generalizations about the rate(s) at which subclass characteristics on toolmarks produced by various types of tools can be expected to be replaced and/or joined by individual characteristics.
>
> Firearms and toolmark examiners have also failed to develop any rules for distinguishing between subclass and individual characteristics. To avoid confusing subclass characteristics shared by more than one tool with individual characteristics unique to one and only one tool, examiners can only rely on their personal familiarity with types of forming and finishing processes and their reflections in toolmarks.

Schwartz, supra at 9.

c. No Standards for Declaring a Match

The firearms field also lacks objective standards for declaring a match. As one toolmark journal article stated: "AFTE has not established specific criteria for a toolmark identification, and describes it as 'based on the examiners' training and experience.'" Jerry Miller & Michael McClean, *Criteria For Identification of Toolmarks*, 30 Ass'n Firearms & Tool MarkExaminers J. 15, 20 (1998).[59] The Florida Supreme Court also noted this when it explained that the identification process is

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[59] Murdoch and Biasotti further explain that the "individualization process [in toolmark identification] relies on pattern recognition, which results from complex interactions between the eyes and the brain." Biasotti & Murdoch, *supra*, 206 n.3. See also Giannelli & Imwinkelried (Forensic Science), *supra*, at 614 ("Although a positive identification is based on objective data (the striation on the bullet surface), the examiner's conclusion is essentially a subjective judgement."); Eliot Springer, *Toolmark Examination–A Review of its Development in the Literature*, 40 J. Forensic Sci. 964, 966-967 (1995); *Theory of Identification as it Relates to Toolmarks*, 30 Ass'n Firearms & Tool Mark Examiners J. 86 (1998) ("Currently the interpretation of individualization/identification is subjective in nature... and based on the examiner's training and experience."); John M. Collins, *The Language of Toolmarks*, 30 Ass'n Firearm & Tool Mark Examiners J. 82, 84 (1998) ("Toolmark identification is... a subjective process requiring skill and experience.").

> entirely subjective and is based on the technician's training and experience; there is no minimum number of matching striations or percentage of agreement or other objective criteria that are used in this method.... There is no objective criteria that must be met, there are no photographs, no comparisons of methodology to review, and the final deduction is in the eyes of the beholder, i.e., the identification is a match because the witness says it is a match.

Ramirez v. State, 810 So.2d 836, 847-848 (Fla. 2001); Glynn, 578 F. Supp. 2d at 572 ("[A]s the literature confirms, ballistics opinions are significantly subjective. Moreover, the standard defining when an examiner should declare a match--namely, 'sufficient agreement'--is inherently vague."); Green,405 F.Supp.2d at 114("[T]here are no national standards to be applied to evaluate how many marks must match."); Monteiro, 407 F.Supp.2d at 369 ("The [toolmark] field... continues to search for a universal standard for when an examiner may declare a 'match.'"). While all scientific deductions have certain overtones of subjectivity, it is when "subjectivity becomes rank speculation that there is just cause for judicial angst." James E. Starrs, *Recent Developments in Federal and State Rules Pertaining to Medical and Scientific Expert Testimony*, 34 Duq. L. Rev. 813, 825 (1996). According to Professor Starrs: "[T]here is subjectivity and there is intolerable subjectivity." Id. The subjectivity in firearms examination is "intolerable."

As explained in United States v. Glynn, 578 F. Supp. 2d at 574,

> Without multiplying examples, it is commonplace that ballistics comparisons involve the exercise of a considerable degree of subjective judgment. This, of course, is true of many other kinds of accepted expertise; a physician's diagnosis, for example, often involves the exercise of subjective judgment, based in part on experience. A notable difference, however, is that ballistics comparison lacks defining standards to a degree that exceeds most other kinds of forensic expertise. For example, whereas both a ballistics examiner and a fingerprint examiner are ultimately called upon to make a subjective judgment of whether the agreement between two pieces of evidence is "sufficient" to constitute a "match", a fingerprint examiner may not declare a match unless a pre-specified number of "points" of similarity exist between the two samples, see, e.g., United States v. Mitchell, 145 F.3d 572, 575 (3d Cir.1998); Plaza, 188 F.Supp.2d at 564. Although attempts been made to introduce similar minimum standards and "protocols" into ballistics analysis, such attempts have not yet met with general acceptance and, in any event, were not

applied by the examiners in Brown and Glynn.

The lack of objective (and easily reviewable) standards considerably debases the fundamental scientific principle of reproducibility. As Judge Gertner pointed out in her well-reasoned opinion: "Reproducibility is an essential component of scientific reliability." Green, 405 F.Supp.2d at 121 If the determination is entirely dependent on one's subjective experience, or as the Florida Supreme Court wrote, "in the eyes of the beholder,"[60] then how can a toolmark examiner's results be critically reviewed by a colleague or an independent defense expert? The short answer is–they can't. The inability to thoroughly review objective criteria to determine whether a result is accurate or not renders firearms identification inherently unreliable and thus inadmissable under Daubert.[6161]

Moreover, the firearms field's theory of identification is so ill-conceived and poorly written it cannot possibly assist the jurors to understand the evidence under Rule 702. AFTE's theory of identification reads as follows:

> a) The theory of identification as it pertains to the comparison of toolmarks enables opinions of common origin to be made when the unique surface contours of two toolmarks

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[60]The conclusion that a toolmark was created by a specific tool is based on a subjective "threshold currently held in the minds eye of the examiner and... based largely on training and experience in observing the difference between known matching and known non-matching impression toolmarks." Richard Grzybowski et al., *Firearm/Toolmark Identification: Passing the Reliability Test Under Federal and State Evidentiary Standards*, 35 Ass'n Firearm & Toolmark Examiners J. 209, 213 (2003) (emphasis added).

[61]See Anne H. McNamee & David Sweet, *Adherence of Forensic Odontologists to the ABFO Guidelines for Victim Evidence Collection*, 48 J. Forensic Science 382 (2003) ("Establishing a consensus of a standard protocol... aids in the unity and reliability of [any] profession."); Gregory N. Derry, What Science Is And How It Works 204 (2002) ("[Scientific] judgments are made within the context of agreed upon methodological standards that allow us to employ nature as a reliable... guide.").

are in "sufficient agreement."

> b) This "sufficient agreement" is related to the significant duplication of random toolmarks as evidenced by the correspondence of a pattern or combination of patterns of surface countours. Significance is determined by the comparative examination of two or more sets of surface contour patterns comprised of individual peaks, ridges and furrows... Agreement is sufficient when it exceeds the best agreement demonstrated between toolmarks known to have been produced by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool. The statement that "sufficient agreement" exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made it is so remote as to be considered a practical impossibility.

As Judge Saris insightfully commented, this definition, for all intents and purposes, represents a tautology:

> Instead, the AFTE Theory, upon which the government relies, is tautological: it requires each examiner to decide when there is 'sufficient agreement' of toolmarks to constitute an 'identification.' This threshold is surpassed when the examiner finds that the agreement of toolmarks 'exceeds the best agreement demonstrated between toolmarks known to have been produced by different tools and is consistent with agreement demonstrated by toolmarks known to have been produced by the same tool.' Toolmark analysis does not follow an objective standard requiring, say, a certain percentage of marks to match. Rather, as noted, this 'threshold is currently held in the minds eye of the examiner and is based largely on training and experience.'"

Monteiro, 407 F.Supp.2d at 370.

Judge Johnson agreed: "The AFTE Theory, thus, does not provide any uniform numerical standard examiners can use to determine whether or not there is a match and, indeed, Mr. Nichols indicated in his testimony that most AFT examiners do not use any numerical standard. Instead, the AFTE theory is circular. An examiner may make an identification when there is sufficient agreement, and sufficient agreement is defined as enough agreement for an identification." United States v. Taylor, 663 F.Supp.2d at 1177.

Judge Gertner also described AFTE's theory of identification as tautological and highly

subjective. See Green,405 F.Supp.2d at 114("Asked about the standards for determining a match that would guide his judgment, O'Shea's testimony [regarding the theory of identification] was either tautological or wholly subjective."). Glynn, 578 F. Supp. 2d at 572 ("[T]he standard defining when an examiner should declare a match--namely, 'sufficient agreement'--is inherently vague.") The theory's lack of clarity (or even sense) increases the risk of jury confusion thereby triggering Rule 403 concerns. Moreover, Rule 403 will also be triggered because there is a great likelihood that this tautological and non-probative testimony will greatly prejudice the defendant.

Many of the district court opinions completely barring or limiting highly subjective forensic identification evidence under Daubert have repeatedly premised exclusion (at least in part) on the fact that these forensic fields did not have any objective standards.[62] Consequently, this Court should do no different, but rather than limit the Government's expert's testimony, this Court should completely bar the firearm evidence because it is so subjective it is inherently unreliable. See Paul C. Giannelli , *The Twenty-First Annual Kenneth J. Hodson Lecture: Scientific Evidence in Criminal Prosecutions*, 137 Mil. L. Rev. 167, 184-85 (1992) ("Subjectivity... necessarily means that room for disagreement exists—specifically, the greater the subjectivity, the greater the chance for error.") (emphasis added).

d. The Lack of Preventative Measures to Minimize Observer and Context Effect

Another factor which renders firearm identification inherently unreliable is the lack of preventative measure to minimize the impact of unconscious observer effects and examiner biases.

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[62] See, e.g., Saelee, 162 F. Supp.2d at 1104; Williamson, 904 F.Supp. at 1556; Lewis, 220 F.Supp. at 553; McVeigh, 1997 WL 47724 *3-4; Hines, 55 Supp.2d at 69; Van Wyk, 83 F. Supp.2d at 522; Green, 405 F.Supp.2d at 114; Fujii, 152 F.Supp.2d at 940.

Firearm identification is a highly subjective endeavor. As a result, the forensic firearm community has a responsibility to ensure their subjective determinations are not contaminated by irrelevant impurities which have no bearing on their analysis. As Professor Risinger has noted: "If there is one thing that seems to have been established clearly by modern cognitive psychology, it is that the more subjective an evaluative process is, the more it is subject to the inaccuracy-inducing effects of expectation and suggestion." D. Michael Risinger & Jeffrey L. Loop, *Three Card Monte, Monty Hall, Modus Operandi, and "Offender Profiling": Some Lessons of Modern Cognitive Science for the Law of Evidence*, 24 Cardozo L. Rev. 193, 223 n.194 (2002) (emphasis added).

The forensic firearm community, specifically, and the forensic community, in general, have failed to grasp this fundamental tenet of cognitive psychology and have therefore neglected or refused to incorporate any preventative measured aimed at minimizing the impact of these powerful influences. See, e.g., Risinger et al., *supra*, at 9 ("Forensic science is one of a very few fields that has not yet profited from this 'science of science.'"); Cole (*More Than Zero*), *supra*, at 1060 ("Forensic science... has remained stubbornly resistant to even recognizing that observer effects may be in force.").

However, recently, that stubbornness has begun to yield in the face of the need to explain away the glaring errors of forensic scientists. As indicated above, the FBI recently admitted that three of its fingerprint "experts" and one defense expert erroneously identified a latent print in the Madrid bombing case as belonging to an Oregon lawyer after the lawyer's print came up as the number 4 candidate of possible suspects generated by an AFIS computer search. According to the FBI's official version of these multiple misidentifications, they were caused because of "confirmation bias (or context effect)" . The solution to overcoming this bias proposed by the F.B.I.

itself, as indicated above, was greater documentation procedures and strict adherence to blind verification procedures. Robert B. Stacey, Unit Chief, Quality Assurance and Training Unit, Federal Bureau of Investigation, *Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, Forensic Science Communication, Jan. 2005, Vol. 7, No. 1, supra. Unless such procedures were used in this case, and they certainly were not, the identification produced by using essentially the same flawed methodology used by the F.B. I. in the Mayfield case cannot be considered reliable under Daubert or Rule 702.

e. The Lack of Educational Standards and No Mandatory Accreditation or Certification

Another factor indicating the error rate in firearms examinations may be unacceptably high is the lack of any educational standards, let alone high standards, within the forensic firearm community, specifically, and forensic identification, generally. For instance, one crime lab director recently admitted: "In our nation, most of the examinations for forensic purposes of fingerprinting and guns [and tools] are performed by law enforcement officers, who were hired for one thing but became an expert in another... Many of them are not from accredited organizations." Carl M. Selavaka, *A Scientist's Perspective on Forensic Science*, 80 Indiana L.J. 72, 74 (2005).

Moreover, the foremost forensic accrediting organization, the American Society of Crime Laboratory Directors, "lists a bachelor's degree with science courses as a 'desirable' qualification for firearm [and toolmark] examiners, it does not list it as 'essential.'" Monteiro, 407 F.Supp.2d at 373 (citing American Society of Crime Laboratory Directors, Laboratory Accreditation Board Manual, 29 (1997)).[63] Simply put, "[m]ost of the [toolmark] witnesses who testify as experts for the

[63] See also Charles A. Lindquist, *Criminalistics Education and the Role of the Criminalistics Educator*, 7 Forensic Sci. Rev. 61, 64 (1995) ("While some have gone on to earn advanced degrees,

prosecution are not truly scientists, but better fit the label of 'technicians.'" Moenssens (Words of Caution), *supra*, at 5. According to Professor Moenssens:

> [Technicians] have been taught to use the complex instruments, such as the infrared spectrophotometer, or the gas chromatograph, or a whole host of other delicate scientific apparatus or even 'simple' breathalyzers, as 'bench operators' who have only a superficial understanding of what the instrument really does, and how the read-out is generated.

Id. at 5-6.[1]

Indeed, it is the "police technician," as Professor Moenssens conceded, who is most likely to misleadingly testify and engage in fraud:

> Unfortunately, this attitude [pro-prosecution] is even more prevalent among some 'technicians' in the crime laboratories, for whom the presumption of innocence disappears as soon as police investigative methods focus on a likely suspect. These individuals, who are frequently trained to do forensic work on the job after obtaining an undergraduate degree in chemistry or biology, are bestowed with the job title of 'forensic scientist' after only a short time in their crime laboratory function. Their pro-police bias is inconsistent with being a scientist. In fact, the less of a scientific background a lab person has, the less critical that person is likely to be in terms of investigating the validity of claims made by other laboratory personnel. These are the 'experts' who typically jump on the bandwagon of anything new that comes down the pike, and will staunchly advocate its reliability, even in the absence of any objective investigation and validated experimentation... Again, many of these individuals do good work in the field in which they have been trained, but their bias is often

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possession of such a degree is usually not characteristic of the laboratory criminalist."). The analyst in this case earned a bachelor's degree in "criminology" with a minor in psychology in 1999. According to her CV, she was hired in 1999 as a firearm examiner for the Department of Public Safety. [Discovery, p. 4947]. How her degree has any relevance to her qualifications as a firearm examiner are unknown.

[1] See also Paul L. Kirk, *The Standardization of Criminological Nomenclature*, 38 J. Crim. L. & Criminology 165, 166 (1947) ("a technician is understood to be a person who is incapable of doing independent work but is skilled in the routine performance of laboratory operations according to a predetermined routine established and supervised by others."); Robert F. Borkenstein, *The Administration of a Forensic Science Laboratory, in* Forensic Science: Scientific Investigation in Criminal Justice 259 (Joseph L. Peterson ed. 1975) ("Technicians perform completely standardized 'cookbook' procedures under the complete supervision of the examiner. Technicians should never be responsible for interpretation.").

> so strongly pro-prosecution that they may lack the kind of objectivity and dispassionate judgment that one expects of a true scientist, be it forensic or otherwise.

Id. at 7.

Research recent empirically supports Professor Moenssens' claim: "Figure 1... indicates that forensic scientists are the witnesses most likely to present misleading or fraudulent testimony." Saks & Koehler (Paradigm Shift), *supra*, at 893.

When Judge Seay held that hair identification did not satisfy Daubert, a key factor which played a role in this outcome was the fact that "hair experts [were] generally technicians testifying for the prosecution, not scientists who [could] objectively evaluate such evidence." Williamson, 904 F.Supp. at 1558.

Additionally, there is no formal process one needs to partake in to become a firearm examiner. Unlike lawyers, teachers, doctors, and even barbers in some states, firearm examiners need not take and pass a national or state certification test. As Professor Peterson conceded:

> Unlike most other scientific professions, the criminalistics... field is without procedures to assess and recognize member of the profession who have satisfied minimum criteria for practicing in their forensic specialty. The profession has no minimum criteria for education and training requirements, experience, or performance on written or practical examinations.

Joseph L. Peterson, *Ethical Issues in the Collection, Examination, and Use of Physical Evidence, in* Forensic Science 42 (Davies ed. 1986).

The forensic firearm identification field is no different, as certification under AFTE is entirely voluntary, as evidenced by the testimony in Monteiro and Green. In essence, then, firearm examiner's competency is characteristically established by two non-science entities—judges and juries. Judges decide whether examiners are legally qualified to testify as experts, while juries settle on whether the experts' testimony is legitimate and believable.

Under this type of system, "courts are required to accept or reject the expert's own claim of expertise, or that of his employer, without the benefit of an impartial and rigorous assessment of his or her capabilities." John E. Murdock, *Forensic Science Ethics: Developing and Integrated System of Support and Enforcement*, 34 J. Forensic Sci. 749, 750-751 (1989). More importantly, this procedure is premised on the assumption the defense even challenges the forensic evidence and the examiner. If the defense does not do so, the examiner's qualifications and competency are not exposed to any scrutiny. For instance,

> In the great majority of criminal cases in which scientific evidence is used, the prosecution offers this evidence without review or cross-examination by the defense. Since, too, the vast majority of criminal cases are resolved through plea bargaining, the prosecution's employment of scientific findings is rarely challenged by the defense. The absence of review (scientific or procedural) means that the prosecution's expert seldom has his/her credentials challenged, scientific procedures reviewed, and results or interpretations of findings questioned by the opposition.

Id. at 749-750.

Accordingly, this Court should follow Judge Seay's lead and exclude firearm testimony because the results and testimony of "police technicians" are inherently unreliable due to their lack of mandatory certification, lack of educational credentials, and incestuous affiliation with law enforcement and the prosecution.

f. The High Rate Of Errors Made In Other Highly Subjective Forensic Identification Fields

Another factor which indicates firearm identification is inherently unreliable are the error rates exhibited in other highly subjective forensic identification fields. As Saks and Koehler recently reported: "Data from proficiency tests and other examinations suggest that forensic errors are not minor imperfections." Saks & Koehler (Paradigm Shift), *supra*, at 895 (emphasis added).

(a). Voice Identification: Spectrographic voice identification error rates are as high as 63%. See Raymond D. Kent & Michael R. Chial, *The Scientific Basis of Expert Testimony on Talker Identification, in* 2 Modern Scientific Evidence 195-224 (David. L. Faigman et al. eds. 2002). This finding is significant because like firearms, a person's voice changes over time.

(b). Handwriting Identification: The error rate in handwriting identification averages around 40% while sometimes reaching 100%. See *The Scientific Status of Handwriting Identification Expertise, in* 2 Modern Scientific Evidence 443-479 (David. L. Faigman et al. eds. 2002). Once again, this error rate should give this Court great cause for concern because firearms identification shares three fundamental weaknesses with handwriting identification–lack of uniqueness, lack of permeability, and lack of objective standards for making the individualization decision.

(c). Bite Mark Identification: The error rate for bite mark identification runs as high as 64%. See C. Michael Bowers, *The Scientific Status of Bitemark Comparisons, in* 2 Modern Scientific Evidence 543-546 (David. L. Faigman et al. eds. 2002).

(d). Hair Identification: False-positive error rates for hair identification are approximately 12% (using results of mitochondrial DNA testing as the criterion). See Max M. Houck & Bruce Budowle, *Correlation of Microscopic and Mitochondrial DNA Hair Comparisons*, 47 J. Forensic Sci. 964 (2002).

(e). Fingerprint Identification: Since 1995, about 25% of examiners failed to correctly identify all latent prints in the proficiency exam administered by Collaborative Testing Services, Inc. See Saks & Rinsinger (Paradigm Shirt), *supra*, at 895.

Accordingly, when the "intolerable" amount of subjectivity in firearms analysis is coupled with the fact that the forensic firearms field has failed to empirically assess the accuracy of its examiners, it is beyond dispute the Government's firearm expert should be barred from testifying because their testimony is inherently unreliable, extremely prejudicial, and of limited probative value. See, e.g., Daubert, 509 U.S. at 595; Fed. R. Evid. 403.

6. The Court Should Give As Little Weight As Possible To The Fact Firearms Identification Is Generally Accepted Among Firearm Examiners

Daubert concluded that the "reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community." Daubert, 509 U. S. at 594. Kumho Tire, 526 U.S. at 150, clarified that Daubert's general acceptance factor does not "help show that an expert's testimony is reliable where the discipline itself lacks reliability, as for example, do theories grounded in any so called generally accepted principles of astrology or necromancy." In order to assess whether a particular discipline itself lacks reliability, it is obviously necessary to consider the views of the broader scientific community. See United States v. Baines, 573 F.3d 979, 991 (10th Cir.2009)(" [W]hile we acknowledge that acceptance by a community of unbiased experts would carry greater weight, we believe that acceptance by other experts in the field should also be considered.")

One prominent criticism in the NAS 2009 Report was that "[t]he forensic science system is underresourced ...in the sense that it has only thin ties to an academic research base that could support the forensic science disciplines and fill knowledge gaps." NAS 2009 Report, p. 15. In the wake of that criticism, the then President of the American Academy of Forensic Sciences wrote that "it seems obvious that a broad swath of scientists should be engaged in examining each forensic

technique about which serious questions have been raised." Bohan, *Strengthening Forensic Science: A Way Station On the Journey to Justice*, J. Forensic Sci., Jan. 2010, Vol 55, No 1.

What a "broad swath of scientists " think about the scientific reliability of the forensic firearm field is revealed in the two NAS reports quoted at length above. Although, under *Baines*, the views of firearm examiners themselves "should be considered, there can be no doubt that for a variety of reasons the views expressed in the two NAS Reports are entitled to "greater weight."

a. The Role of "Service Provider" Blunts Any Dissent

Defendant concedes that there is evidence to suggest that the AFTE theory of identification appears to be widely accepted by trained firearms examiners, although it is not universally followed. See, Taylor, 663 F.Supp.2d at 1178. ("The AFTE Theory appears to be widely accepted by trained firearms examiners, although it is not universally followed.") The depth and breadth of this general acceptance, however, cannot be too wide or deep considering what the Monteiro court learned. According to Judge Saris:

> At least in Massachusetts, however, the AFTE Theory does not appear to be a broadly recognized document. Apparently, while the AFTE Theory appears to be widely accepted by trained firearms examiners, it is not universally followed. Sgt. Weddleton testified that he had never before even seen or heard of it. Not only that, Mary Kate McGilvray, of the Massachusetts State Police Crime Lab, also testified that she had never before read the AFTE Theory and that it was not the policy in her lab.

Monteiro, 407 F.Supp.2d at 370.

That there is a modicum of general acceptance within the toolmark community is not surprising, especially when one considers the community's incestuous affiliation with law enforcement and prosecutorial agencies. Forensic practitioners, like their academic counterparts, employ scientific techniques in order to find truth in particular contexts. However, their societal role differs considerably from academic scientists because their primary function is to afford a service

to a consumer by answering specific inquiries about evidence. In essence, forensic practitioners are service providers whose services are usually offered to law enforcement or prosecutorial agencies. The role of "service provider" has significant repercussions, particularly concerning error rate detection and general acceptance. Playing such a role has forced the forensic science community to develop a guild-like mentality. Forensic scientists frequently avoid answering questions regarding a technique's accuracy while also refraining from publicly criticizing a fellow colleague's questionable work. In short, a communal attitude has developed where practitioners are frowned upon by their fellow peers when their publications reflect negatively on the forensic community's work product. Quelling any criticism achieves the community's ultimate goal of "promoting the impression that their techniques are accurate and reliable and that their conclusions are trustworthy." William C. Thompson, *A Sociological Perspective on the Science of Forensic DNA Testing*, 30 U.C. Davis 1113, 1114 (1997). These credibility-enhancing labors, however, are antithetical to science's self-centered scrutiny. More importantly, they severely inhibit forensic practitioners from identifying and rectifying problems associated not only with certain forensic methodologies but also with particular theories (e.g., the theory of individuality).

For instance, consider the many forensic techniques which have been discredited by legitimate independent research but for years were "generally accepted" as accurate identification techniques by the relevant forensic and law enforcement communities:

(1). Dermal nitrate test: The paraffin test or dermal nitrate test for the recent discharge of a firearm is perhaps the most memorable. Although paraffin testing was first admitted into a criminal case in 1936, see Commonwealth v. Westwood, 324 188 A. 304 (Pa. 1936), the forensic community failed to thoroughly research its validity until the late 1960s. This (belated)

research clearly established its unreliability, as it generated an intolerable amount of "false positives." See Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 Colum. L. Rev. 1197, 1224-25 (1980).

(2). Voiceprint Identification: During the 1970s, prosecutors and law enforcement experts vigorously pushed for the admissibility of voiceprint technology before they adequately researched its validity. For a period, the voiceprint advocates won many minor battles, as various courts permitted voiceprint experts to testify about voiceprint technology. However, once scientists outside of forensic science began studying the technology, they raised several questions regarding its purported accuracy. To settle the debate, the FBI commissioned the National Academy of Science [NAS] to study the voiceprint technology. The NAS committee concluded that insufficient data existed to substantiate voiceprinting's underlying theory. See Committee on Evaluation of Sound Spectrograms, National Academy of Sciences, On the Theory and Practice of Voice Identification 42 (1979).

(3) Electrophoretic Blood Testing: During the late 1970s and early1980s, prior to DNA testing, forensic technicians and prosecutors forcefully advocated for the admissibility of electrophoretic blood testing, as these tests supposedly "provided significant advances in the ability to tell one blood sample from another so that it [was] almost possible to determine whether a particular specimen of blood came from a specific person." Jonakait (Will Blood Tell?), *supra*, at 833. Like voiceprinting and the paraffin test, electrophoretic testing was not thoroughly scrutinized and researched by forensic examiners before they started their admissibility campaign. Moreover, their campaign continued despite the fact that the limited scientific literature available at the time contained "proven and potential areas of unreliability in the tests." Id. at 912. Courts, unfortunately,

admitted electrophoretic testing while few defense attorneys challenged the new procedures and techniques. It was not until years after electrophoretic testing was initially admitted that nonpartisan scientists were able to legitimately establish electrophoretic testing's questionable reliability. See, e.g., People v Harbold, 464 NE2d 734 (Ill. App. 1984); People v. Young, 391 N.W.2d 270 (Mich. 1986); People v Holbrook 397 NW2d 832 (Mich. 1986); People v Lewis, 408 NW2d 94 (Mich. 1987).

(4). Burn Pattern Analysis: For more than three decades, arson investigators relied on anecdotal theories about fire dynamics and the meaning of particular shaped burn patterns to conclude whether a fire was intentionally set. These theories were never empirically tested until the late 1990s. When the U.S. Fire Administration published the results of their empirical research, "[s]everal of the 'old fire investigator's tales and fire investigation misconceptions... were... shown to be unsubstantiated by the... testing." John J. Lentini, *The Scientific Basis of Expert Testimony on Fire, Arsons, and Explosions, in* Science in the Law: Forensic Science Issues 359 (David L. Faigman et al., eds. 2002). A group of independent experts recently demonstrated that Texas executed an innocent man based on junk arson science. See, Arson Review Committee, *Report on the Peer Review of the Expert Testimony in State of Texas v. Willingham and State of Texas v. Willis* (April 2006).[65]

(5). Gun Shot Residue Test: Similar to dubious burn pattern testimony, prosecutors and investigators have relied on gunshot residue (GSR) tests to secure convictions in circumstantial evidence cases for more than two decades. Recent evidence, however, has cast significant doubts

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[65] Available at: http://www.innocenceproject.org/docs/ArsonReviewReport.pdf.

on GSR's validity. See, e.g., Francesco S. Romolo & Pierre Margot, *Identification of gunshot residue: A critical review*, 119 Forensic Sci. Int'l. 195 (2001); Carlo Torre, Grazia Mattutino, Valentina Vasino, & Carlo Robino, *Brake Lining: A Source of Non-GSR Particles Containing Lead, Barium and Antimony*, 47 J. Forensic Sci. 494 (2002). In March, 2006, the F.B.I. formally abandoned this technique. See, Diana Wright and Michael Trimpe, *Summary of the FBI Laboratory's Gunshot Residue Symposium*, May 31–June 3, 2005, Forensic Science Communications July 2006, Volume 8, Number 3 ("The FBI recently decided to stop conducting GSR examinations.").[1]

(6). Comparative Bullet Lead Analysis (CBLA): For more than thirty years, the FBI used comparative bullet lead analysis (CBLA) to secure convictions in circumstantial cases. CBLA's primary assumption, like that of firearm examiner's, is that each batch of lead which produces bullets is unique and thus no two batches will ever have similar or identical compositional signatures. However, after initial independent research called into question the validity of CBLA's metallurgical premises, in 2003 the FBI finally requested the National Research Council (NRC) to exhaustively research these premises to determine whether they were legitimate. The NRC's report concluded that CBLA was premised on faulty metallurgical premises. See National Research Council, Forensic Analysis: Weighing Bullet Lead Evidence (2004). Based on this report and other recent literature finding the technique faulty at least one federal court and four state courtsts have now found bullet lead composition analysis unreliable under Daubert or not generally accepted anymore under Frye. See, United States v. Mikos, 2003 WL 22922197 (N.D. Ill., Oct. 31, 2003); Clemons v. State, 392 Md. 339, 896 A.2d 1059 (Md.2006); Ragland v. Commonwealth, 191 S.W.3d 569, 580 (Ken. 2006); State v. Behn, 868 A.2d 329 (N.J. Super. 2005). The F.B.I. recently

[1]Available at: http://www.fbi.gov/hq/lab/fsc/current/research/2006_07_research01.htm

abandoned this technique as well, although it had been using it for over 30 years to secure convictions. See, United States Department of Justice, Federal Bureau of Investigation, Press Release, September 1, 2005, http://www.fbi.gov/pressrel/pressrel05/bullet_lead_analysis.htm (" The FBI Laboratory today announced that, after extensive study and consideration, it will no longer conduct the examination of bullet lead...One factor significantly influenced the Laboratory's decision to no longer conduct the examination of bullet lead: neither scientists nor bullet manufacturers are able to definitively attest to the significance of an association made between bullets in the course of a bullet lead examination.")

(7). Fingerprints

Most recently, in the most carefully litigated challenge to the admissibility of the F.B.I's fingerprint methodology ("ACE-IV"), the F.B.I. sold a federal court of appeal the idea that the F.B.I. had never committed an error in actual casework, and that using by using the F.B.I's generally accepted subjective " gestalt" ACE-IV methodology " a paucity of Galton points can be compensated for by high-quality Level 3 detail." *United States v. Mitchell*, 365 F. 3d 215, 222 (3rd Cir. 2004). Shortly after this opinion was rendered, three F.B. I.'s experienced fingerprint examiner, and one equally experienced defense expert, misidentified a latent print in the Madrid bombing case as having come from Oregon lawyer Brandon Mayfield. The United States Department of Justice, Office of the Inspector General recently released its official report of the incident, finding that the errors were caused by a combination of factors, including: (1) the unusual similarity of the prints; (2) bias from the known prints of Mayfield; (3) inadequate explanations for differences in appearances; (4) failure to access the poor quality of similarities; (5) failure to re-examine the print after the Spanish National Police informed the F.B. I. of the likely error; and , most importantly, (6)

faulty reliance on extremely tiny "Level 3" details.[67] In regard to the last factor, the OIG wrote that "[b]ecause Level 3 detail are so small, the appearance of such details in fingerprints is highly variable, even between different fingerprints made by the same finger. As a result, the reliability of Level 3 details is the subject of some controversy within the latent fingerprint community." (Report, p. 8). In other words, a "forensic science" that had only months before been presented by one branch of the Department of Justice as reliable and generally accepted, was now being labelled by another division of the same Department as unreliable and controversial.

Because of events such as these, the Court should be on guard, especially in a capital case, to prevent the introduction of faulty forensic science merely because it has been used in the past. As the court put it so eloquently in State v. Behn, 868 A.2d 329, 343 (N.J. Super. 2005):

> Science moves inexorably forward and hypotheses or methodologies once considered sacrosanct are modified or discarded. The judicial system, with its search for the closest approximation to the "truth," must accommodate this ever-changing scientific landscape.

b. Frye's General Acceptance Standard Did Not Force the Forensic Firearm Community, Specifically, or the Forensic Community, Generally, to Conduct Research To Ascertain Whether Identification Techniques Were Scientifically Sound

As one federal court has commented, the "fact that [forensic] evidence has been generally accepted in the past by courts does not mean that it should be generally accepted now, after Daubert and Kumho." Saelee, 162 F. Supp.2d at 1105. Likewise, another district judge has written that the "application of Daubert/Kumho Tire analysis" can easily " result[] in the exclusion of evidence that

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[67] United States Department of Justice, Office of the Inspector General, A Review of the F.B.I.'s Handling of the Brandon Mayfield Case (March 2006), http://www.usdoj.gov/oig/special/s0601/exec.pdf.

might otherwise have been admitted under *Frye*." Horn, 185 F.Supp.2d at 553. The district judge added:

> If undertaken as intended, it does expose evidentiary weaknesses that otherwise would be overlooked if, following the dictates of Frye, all that is needed to admit the evidence is the testimony of one or more experts in the field that the evidence at issue derives from methods or procedures that have become generally accepted.

Id.; see also Crisp, 324 F.3d at 272 (Michael, J., dissenting) ("Nothing in the Supreme Court's opinion in *Daubert* suggests that evidence that was admitted under *Frye* is grandfathered in or is free of the more exacting analysis now required.").

In *United States v. Williams*, 506 F.3d 151 (2d Cir.2007), while concluding that the Government's firearms identification expert's methodology "satisfied" *Daubert*, the Second Circuit cautioned that its opinion should not "be taken as saying that any proffered ballistic expert should be routinely admitted." Id. at 161. It noted that Daubert did not " 'grandfather' or protect from Daubert scrutiny evidence that had previously been admitted under Frye v. United States, 293 F. 1013 (1923)]." Id. at 162. The Williams Court explained that past acceptance does not render expert testimony admissible; rather, "expert testimony long assumed reliable before Rule 702 must nonetheless be subject to the careful examination that Daubert and Kumho Tire require." Id.

At least one district court has ruled that "[g]iven the publication of the NRC Forensic Science Report in 2009 and the NRC Ballistic Imaging Report in 2008-two reports (discussed infra) which I find to be particularly credible in evaluating the scientific status, vel non, of firearms toolmark identification methodology-I find particularly compelling the caveat expressed by the Williams Court not to 'grandfather' admissibility of evidence merely because it has been universally admitted in the past." United States v. Willock, 696 F.Supp.2d 536, 564 (D.Md.2010).

As these courts have learned, Frye's general acceptance standard did little to ensure the forensic community conducted legitimate research to ascertain whether the many remarkable claims made by forensic identification examiners could withstand the eternal scrutiny of science.[68] More remarkably, though, is the fact forensic examiners and prosecutors, themselves, admit Frye did not force them to produce any scientific research to substantiate their CSI-like claims. For instance, after Daubert was decided, two toolmark examiners made this observation regarding Daubert's likely impact on toolmark identification: "In light of recent court decisions... it is no longer acceptable to state, "I know [a match] when I see [a match]." Miller & Mclean, *supra*, at 20. Likewise, the United States Attorney who prosecuted Timothy McVeigh made the following comments relating to the inadmissibility of questioned document examiners during McVeigh's trial: "Like many forensic disciplines and unlike other scientific fields that can support research and marketing outside the courtroom, forensic document examiners traditionally had not had any particular reason to conduct validity studies because their testimony was being admitted without them." J. Orenstein, *Effect of the Daubert Decision on Document Examinations from the Prosecutor's Perspective* (June 14-18, 1999) (emphasis added). [69]

These concessions cannot be any clearer, in that the only thing Frye forced the forensic communities to do was to count noses rather than conduct legitimate scientific research. See Williamson, 904 F.Supp. at 1558 ("Not even the 'general acceptance' standard is met, since any

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[68] See, e.g., Margaret A. Berger, *Procedural Paradigms for Applying the Daubert Test*, 78 Minn. L. Rev. 1345, 1353 (1994) ("Considerable forensic evidence made its way into the courtroom without empirical validation of the underlying theory and/or its particular application."); Saks (Merlin & Solomon), *supra*, at 1082-90 (arguing courts have generally subjected forensic science evidence to insufficient scrutiny under Frye's general acceptance standard).

[69] Available at: http:// www.fbi.gov/programs/lab/fsc/backissu/oct1999/abstrcte.htm

general acceptance seems to be among hair experts who are generally technicians testifying for the prosecution, not scientists who can objectively evaluate such evidence."). Consequently, because Daubert plainly raised the standard for existing, establishing fields, "inviting a reexamination even of generally accepted venerable, technical fields, " Hines, 55 F.Supp.2d at 67, this Court would be abusing its discretion if it placed a great amount of weight on the fact forensic firearms identification is generally accepted by forensic firearms examiners themselves. If this Court were to rule as such, it would be "grandfathering old irrationality" Id. at 68 n.13, and "may unwittingly perpetuate and legitimate junk science." Lewis, 220 F.Supp.2d at 554. In the end, as Judge Grimm expressed in Horn, "neither science [nor] technology may rest on past accomplishments–nor may the courts." Horn, 155 Supp.2d at 536 n.15.

7. There Is Not Peer Review In the Forensic Firearms Profession As Envisioned by Daubert

This Court should exclude the Government's firearms evidence because the peer review process employed by firearms examiners is not the type of peer review envisioned by Daubert or Kumho Tire. Peer review "as contemplated by Daubert and Kumho Tire must involve critical analysis that can expose any weaknesses in the methodology or principles underlying the conclusions being reviewed." Horn, 155 F.Supp.2d at 556. As many district court have learned, when it comes to forensic identification evidence this type of "critical analysis" is noticeably absent, see Fujii, 152 F.Supp.2d at 940; Hines, 55 F. Supp.2d at 68; Starzecpyzel, 880 F. Supp. at 1038; Oskowitz, 294 F.Supp.2d at 884, and the firearms field is no different.

Judge Gertner recently learned this in Green when she held: "there [is no] evidence of any peer-reviewed publications in the ballistics/toolmark field as that idea is understood in Daubert and

Kumho." Green, 405 F.Supp.2d at 122 n.32. The Florida Supreme Court also made a similar observation with respect to so-called "North American" peer reviewed journals:

> At the Frye hearing below, the court reviewed two groups of published articles addressing knife mark evidence-one group North American, the other European. The North American articles were written by law enforcement technicians and while several of those articles address principles related to Hart's theory none undertakes the kind of searching, critical review that is the sine qua non of scientific acceptance. Ramirez, 810 So.2d at 849-850 (emphasis).

The lack of critical analysis is not surprising for two reasons. First, because toolmark identification has no utility outside the courtroom it is unlikely to draw the interests of other non-forensic scientists. For instance, DNA research is considered far more superior than other forensic identification research because DNA has numerous applications outside the courtroom which draws the interests of neutral, non-law enforcement related scientists. Judge Gertner recognized this distinction in Green:

> The AFTE publishes a journal that is peer-reviewed by other members of the field, but the 'field' consists entirely of individuals who work for law enforcement agencies. In contrast, the DNA-typing 'field' involves neutral academics as well as law enforcement personnel.

Green, 405 F.Supp.2d at 109 n.7.

The district court in Saelee also made a similar observation with respect to handwriting identification:

> [Mr. Cawley] offered a four-page list of published and unpublished articles dealing with handwriting analysis. According to Mr. Cawley, these articles are written by forensic document examiners, and the published articles are presented at professional meetings for peer review. However, Mr. Cawley also testified that he did not know whether any of the articles discussed error rates, empirical testing, or coincidental matches, although he claimed to have read the articles. The list, without analysis of the substance of the articles, is of little use to the court. The court infers that most of the listed articles were written by proponents of the guild style (apprentice training) process of training handwriting examiners. This is Mr. Cawley's

> background. It is a training process little used today in professional and scientific callings.

Saelee, 162 F.Supp.2d at 1103 (emphasis added).

Second, in order for any forensic community to sustain its continued legitimacy within the courtroom there can be only a bare minimum of dissent. Again, the toolmark examiner's unique role as service provide explains why such dissent must be kept at a bare minimum. As Professor Thompson explained:

> The role of forensic scientists as service providers has important implications. Like most service providers, forensic scientists must convince their clients that their services are valuable in order to succeed professionally. This imperative is most obvious for private laboratories, which often advertise and promote their services with commercial zeal. It is also important for employees of government laboratories who gain prestige and justify larger budgets by convincing public officials of the value of their services.
>
> Because they need to sell their services, forensic scientists have incentives to put the best possible face on their work, to promote the impression that their techniques are accurate and reliable and that their conclusions are trustworthy. I believe that these incentives cause forensic scientists to act more like members of a trade guild than participants in a scientific discipline. For example, they may avoid openly raising questions about the reliability of forensic tests, avoid public discussion of technical problems or concerns, and refrain from publicly criticizing the work of other forensic scientists. They may also avoid publishing anything that might reflect negatively on their field, thereby making forensic science journals forums for self-promotion rather than self-criticism.
>
> The problem with these credibility-enhancing efforts is that they are inconsistent with traditional forms of scientific self-scrutiny. This self-scrutiny is needed to maintain the quality of forensic science as a science. Forensic scientists may be slow to identify and solve problems with their techniques because problems are rarely discussed openly. The insularity of forensic science makes matters worse. The work of individual forensic scientists often receives little or no external scrutiny, therefore errors are often difficult to detect.

Thompson, *supra*, 1114-1115.

Moreover, the verification process utilized by toolmark examiners after they have made an identification is not what Daubert envisioned when it discussed the peer review concept. No only does this form of peer review suffer from observer effects, it is was never intended to ensure the

accuracy of the initial examiner's identification. Formalistic or administrative peer review is the type of peer review advocated by ASCLD standard 1.4.2.16. The ASCLD standard indicates that the function of a laboratory's peer review process is "to ensure that the conclusions of its examiners are reasonable and within the constraints of scientific knowledge." Under the "formalistic" peer review model, the reviewer functions as a process check on the procedures utilized by the initial examiner; making certain the initial examiner's report adequately documents and explains its findings and conclusions. That the reviewing examiner is, in effect, merely ensuring the initial examiner's report contains all the necessary formalities (e.g., what techniques were used, has the examiner thoroughly documented his findings to explain his conclusion, etc.), then knowing the initial examiner's conclusions is perhaps needed. This form of peer review, however, should not be mistakenly interpreted as an independent verification of the initial conclusion's accuracy.

Thus, the fact firearm examiners have their results reviewed by another co-worker (who knows the initial examiner's results) says nothing about the accuracy of their results. As the district court in Lewis noted: "There were aspects of Mr. Cawley's testimony that undermined his credibility.... Mr. Cawley said that his peers always agreed with each others' results and always got it right. Peer review in such a 'Lake Woebegone' environment is not meaningful." Lewis, 220 F.Supp.2d at 554.

Consequently, this Court should bar the Government's toolmark expert from testifying because his methodology has not been critically evaluated by an "unbiased and financially disinterested community of practitioners and academics." Fujii, 152 F.Supp.2d at 940. This lack of independent scientific scrutiny renders the toolmark methodology and any testimony premised on it inherently unreliable and thus inadmissable under Daubert and Rule 702.

B. The Expert Should Not Be Allowed To Testify To Inconclusive Results

As indicated above, Rule 702 requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702. "Relevant expert testimony must logically advance a material aspect of the case, and be sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute. " United States v. Garcia, 635 F.3d 472, 476 (10th Cir. 2011)(citations and internal quotations omitted). In other words, "[e]xpert testimony is admissible only if it is potentially helpful to the jury" and it satisfies the other requirements of Rule 702. United States v. Baines, 573 F.3d 979, 985 (10th Cir.2009)

In this case, Ms. Babcock states in her report her opinion that certain bullets or shell casings can "neither be identified nor eliminated from having been fired from" certain weapons. What she does not state in her report, but which is reflected in the Laboratory's Protocol included on the Exhibit CD as Exhibit 6, is that such findings are properly classified as "inconclusive." [1]

An inconclusive result cannot be helpful to the jury, it does not logically advance a material aspect of the case, and it is not sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute. This testimony should therefore be excluded.

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[1] The Lab Protocol states:
An inconclusive result is reached when the following occurs:
A] There is some agreement of individual characteristics and all discernable class characteristics, but insufficient for an identification.
B] There is agreement in all discernable class characteristics without agreement or disagreement in individual characteristics due to an absence, insufficiency or lack of reproducibility.
C] There is agreement in all discernable class characteristics and disagreement in individual characteristics but insufficient for an elimination.

The Supreme Court held in *Daubert I*, 509 U.S. at 590-91, 113 S.Ct. at 2795- 96, that Rule 702 requires "the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable." The Court also made clear that "Rule 702 further requires that the evidence or testimony 'assist the trier of fact to understand the evidence or to determine a fact in issue.' This condition goes primarily to relevance." (Id. at 599). The Court also emphasized that the phrase "scientific ...knowledge" in Rule 702 "connotes more than subjective belief or unsupported speculation." (Id. at 590)

Under this standard, the Ninth Circuit held in *Daubert v. Merrell Dow Pharm.*, 43 F.3d 1311, 1313 (9th Cir.1995) (*Daubert II*) that expert testimony offered to prove causation did not satisfy the relevance requirement because the evidence suggested only that use of the drug at issue "could possibly have caused plaintiffs' injuries," rather than "more likely than not" caused the injuries, i.e., that use of the drug more than doubled the likelihood the injuries would occur. 43 F.3d at 1320-22. The Court also held that "(f)ederal judges must... exclude proffered scientific evidence under Rules 702 and 403 unless they are convinced that it speaks clearly and directly to an issue in dispute in the case, and that it will not mislead the jury." Id. at 1321 n. 17.

Similarly, in *Hull v. Merck & Co., Inc.*, 758 F.2d 1474, 1477 (11th Cir.1985) (per curiam) the Eleventh Circuit found that admission of speculative and "potentially confusing testimony is at odds with the purposes of expert testimony as envisioned in Fed.R.Evid. 702."

In *Bryte v. Am. Household, Inc.*, 429 F.3d 469, (4th Cir. 2005) the Fourth Circuit reached the same result, ruling that an arson expert was properly prohibited from expressing an opinion as to the cause of a fire because he did not, consistent with the standards of his profession, exclude "[a]ll other reasonable origins and causes" . The court was guided by the principle that "*Daubert*

aims to prevent expert speculation, and our review of the record convinces us that [the expert's failure to address alternative explanations] cannot be reconciled with the reliability mandate." (Id. at 477).

In Marryland, Judge Bennett has cited *Bryte* in support of a ruling that an expert's speculative opinion is inadmissible under Rule 702: "the opinion offered by [the expert] is speculative. Instead of opining that the car's intermittent failure to start *is* indicative of a manufacturing defect, [the expert] opines that this condition "*can* be indicative of a defect in materials and workmanship." ...By merely opining that it is *possible* that Plaintiff's car is defective, [the expert] is engaging in speculation and conjecture with respect to whether the car is *in fact* defective. As a result, [the expert's] opinion would not assist the trier of fact to understand the evidence in this case or to determine facts in issue. Accordingly, this Court concludes that the opinion offered by [the expert] is inadmissable under Fed.R.Evid. 702." *Heaps v. General Motors Corp.*, 2006 WL 2456231, *5 (D.Md.2006). Speculative opinions about inconclusive results do not qualify as "scientific...knowledge" within the meaning of Rule 702 because " the word 'knowledge' connotes more than subjective belief or unsupported speculation." *Daubert v. Merrell Dow Pharm.*, 509 U.S. at 590-91.

Numerous other courts have also prohibited speculative opinions in a variety of contexts, including even speculative opinions by DNA experts. See e.g., *United States v. Frazier*, 387 F. 3d 1244, 1265 (11th Cir. 2004) (opinion of expert properly excluded where the "probability it expresses is unclear, imprecise, and ill defined."); *United States v. Natson*, 469 F.Supp.2d 1253, 1258 (M.D.Ga. 2007)("The only conclusion that Weiss can reach from his testing is that the Defendant is 'possibly' the father. The possibility that Defendant is the father may be higher than others at 26

to 1, but it does not rise to any reasonable level of scientific certainty. It would be sheer speculation for a jury to determine from Weiss's testimony that Defendant is the father. Therefore, the Court finds that the testimony is not relevant and would not assist the trier of fact. Accordingly, it is not admissible under Federal Rules of Evidence 702, 401, and 402."); *United States v. Rutherford* (D. Neb. 2000) 104 F. Supp. 2d 1190 (testimony of handwriting expert that defendant "very probably" authored a document was too speculative to be admissible.)

In light of the speculative nature of the opinions being offered with respect to inconclusive results, the probative value of his testimony is nonexistent. Furthermore, whatever slight probative value there is to such speculative testimony is clearly outweighed by the danger that the jury will place undue reliance on such speculation. This testimony is therefore inadmissible under *Daubert,* Rule 702, Rule 403, and 18 U.S. C. § 3592(c).

C. An Evidentiary Hearing Should Be Granted

As pointed out above, in response to the defendant's motion to depose the government's experts, the government took the position that depositions were unneccessary because "numerous Daubert motions presumably will be heard by this Court wherein the experts for the Government will testify, as well as being available to testify at trial and subject to cross-examination." (Id.) See also, Doc. 386 ("Specifically, the United States asks the Court make a finding, upon hearing testimony of the witnesses, that they have 'a reliable basis in the knowledge and experience of [their relevant] discipline[s].' ")(quoting Kumho Tire, 526 U.S. at 149).

As the government appears to acknowledge, the Court should hold an evidentiary evidentiary to resolve the present motion. Even in a non-capital civil case, the Tenth Circuit is "concerned with the trial court's performance of its obligation under Rule 702 and Daubert, not upon the exact

conclusions reached to exclude or admit expert testimony." Frederick v. Swift Transp. Co. 616 F.3d 1074, 1082 (10th Cir. 2010). In that case, the Tenth Circuit concluded that the district court had faithfully executed its gatekeeper role under the following circumstances:

> First, as to the court's gatekeeper function, the record shows that for both witnesses the district court considered preliminary briefing, which included legal argument as well as deposition transcripts and full copies of the experts' reports. The court then held Daubert hearings where the witnesses were subjected to examination by both sides, and, as concerned Dr. Sperry, the court considered additional briefing following the hearing. Finally, the court issued detailed opinions as to each witness containing "specific findings on the record," [Dodge v. Cotter Corp., 328 F.3d 1212, 1223 (10th Cir.2003).](emphasis and internal quotation marks omitted), concerning the reliability and relevance of the proffered testimony. After a careful review, we conclude there was no error in the manner in which the district court performed its role as a gatekeeper under Rule 702 and Daubert.

(Id. at 1082)

It is true that it is within the broad discretion of the Court to determine the means for assessing an expert's reliability and to make the ultimate determination of reliability. United States v. Velarde, 214 F. 3d 1204, 1208-09 (10th Cir. 2000). However, here, as in Frederick, an evidentiary hearing should be conducted because the factual and legal showing Mr. McCluskey makes in support of this motion is substantial, because the existing documentation provided by the government is insufficient to carry the government's burden of proof, and because M. McCluskey faces the ultimate penalty.

V. Conclusion

Daubert and Rule 702 mandates that this Court conduct a searching inquiry of any proposed expert testimony to ensure it is not only relevant but reliable. This inquiry, according to Daubert, should focus on such issues as testability, peer review, error rate, standards, and general acceptance. The defendants have offered more than sufficient evidence to demonstrate that firearm

evidence does not satisfy any of these reliability factors. As a result, firearm identification evidence is inherently unreliable and inadmissible under Daubert. Moreover, due to its unreliability, and the lack of any acceptable methodology that was followed in this case, it is also inadmissible under Rule 702 . Lastly, the proposed firearm testimony in this case, which appears to bebased on nothing more than "eyeballing it" is irrelevant and not helpful and will easily mislead and confuse the trier of fact just as it has confused the prosecutor which will undoubtably result in great prejudice to the defendant. Consequently, it is also inadmissible under Rule 402 and 403. There are also Rule 16 and discovery violations which warrant a finding of inadmissability.

In closing, the defendants would like to reiterate the words of Judge Gertner in Green:

> While I recognize that the Daubert-Kumho standard does not require the illusory perfection of a television show (CSI, this wasn't), when liberty hangs in the balance–and, in the case of the defendants facing the death penalty, life itself–the standards should be higher than were met in this case, and than have been imposed across the country. The more courts admit this type of toolmark evidence without requiring documentation, proficiency testing, or evidence of reliability, the more sloppy practices will endure; we should require more.

Green, 405 F.Supp.2d at 109

For the above-stated reasons, Mr. McCluskey respectfully request that this motion to exclude the government's firearm examination evidence be granted unless the government can prove at a *Daubert* hearing that this evidence meets *Daubert* and Rules 402, 403, 702, and 18 U.S.C. 3593(c)..

Dated: April 22, 2012

Respectfully submitted,

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CERTIFICATE OF CONFERENCE

I hereby certify that on April 22, 2012, I contacted Assistant United States Attorney Linda Mott to determine the government's position on this motion. Ms. Mott advised that the government is opposed to the motion.

/s/ Michael N. Burt

Michael N. Burt