IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF HAWAII

UNITED STATES OF AMERICA,	)	CRIM. NO. 06-00079 JMS/KSC
	)	
Plaintiff,	)	PRELIMINARY ORDER DENYING
	)	DEFENDANT'S RENEWED MOTION
vs.	)	TO EXCLUDE EXPERT TESTIMONY
	)	CONCERNING THE
NAEEM J. WILLIAMS,	)	IDENTIFICATION OF BIOLOGICAL
	)	MATERIAL [DNA AND SEROLOGY],
Defendant.	)	AND REQUEST FOR DISCOVERY,
	)	DOC. NO. 2043, ON ALL ISSUES
	)	EXCEPT WHETHER THE ONORATO
	)	REPORT FAILED TO PROPERLY
	)	TAKE INTO ACCOUNT THE
	)	POSSIBILITY OF PRIMER BINDING
	)	SITE MUTATIONS IN PERFORMING
	)	PCR STR DNA COMPARATIVE
_____	)	ANALYSES

PRELIMINARY ORDER DENYING DEFENDANT'S RENEWED MOTION TO EXCLUDE EXPERT TESTIMONY CONCERNING THE IDENTIFICATION OF BIOLOGICAL MATERIAL [DNA AND SEROLOGY], AND REQUEST FOR DISCOVERY, DOC. NO. 2043, ON ALL ISSUES EXCEPT WHETHER THE ONORATO REPORT FAILED TO PROPERLY TAKE INTO ACCOUNT THE POSSIBILITY OF PRIMER BINDING SITE MUTATIONS IN PERFORMING PCR STR DNA COMPARATIVE ANALYSES[1]

[1] As directed in the Court's August 23, 2013 Order Requiring Supplemental Briefing, Doc. No. 2135, the parties are providing the court additional briefing regarding the issue of primer binding site mutation and allelic dropout. This Order denies Defendant's Motion as to all issues except this one. A subsequent Order will address this latter issue.

I. INTRODUCTION

In this capital criminal action, Defendant Naeem Williams ("Defendant") is accused of, among other things, unlawfully killing five-year-old Talia Williams ("Talia") in violation of 18 U.S.C. §§ 2, 7(3), and 1111(a) & (b). When this action was previously before now-Senior District Judge David A. Ezra, Defendant brought a "Motion to Exclude Expert Testimony Concerning the Identification of Biological Material [DNA and Serology]," which challenged the reliability and validity of the opinions included in reports by FBI Supervisory Forensic Examiner Anthony J. Onorato (the "Onorato Report") and FBI Forensic Examiner Caroline M. Zervos (the "Zervos Report"). Doc. No. 958. The Onorato Report identifies that to a reasonable degree of scientific certainty Talia was the source of DNA found on several items in the residence where both he and Talia lived, and that those samples came from a female. The Zervos Report provides that blood was identified on certain specimens taken from Defendant's residence, and that a chemical test for the possible presence of blood was positive on other samples. Because Defendant's Motion failed to raise specific objections to the methods used by the forensic examiners, Judge Ezra denied it without prejudice for Defendant to raise such arguments either during trial or via a motion brought closer to trial. Doc. No. 1178.

Currently before the court is Defendant's May 28, 2013 Renewed Motion to Exclude Expert Testimony Concerning the Identification of Biological Material [DNA and Serology] ("Motion to Exclude Expert Testimony").[2] Doc. No. 2043-1. Defendant seeks to exclude the opinions contained in the Onorato and Zervos Reports on the basis that the methodologies are unsound and the conclusions are unsupported, and therefore run afoul of *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) ("*Daubert I*"), Federal Rule of Evidence 403, and 18 U.S.C. § 3593(c). The government filed an Opposition on July 5, 2013, Doc. No. 2058, Defendant filed a Reply on July 19, 2013, Doc. No. 2098, and the government filed a supplemental response on August 5, 2013. Doc. No. 2112. A hearing was held on August 22, 2013. Based on the following, the court DENIES the Motion to Exclude Expert Testimony as to the particular arguments addressed in this Order.

II. FACTUAL BACKGROUND

At issue are the methodologies used, and the opinions contained, in the Onorato and Zervos Reports.

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[2] The Motion includes a request for discovery, which the government has agreed to provide. *See* Doc. No. 2068, Gov't Opp'n at 15-16. At the August 22, 2013 hearing, the parties discussed the manner in which the government must make certain information available. *See also* Doc. No. 2098, Reply at 13 (objecting to having to go to Quantico, Virginia to view certain categories of evidence). The parties agreed to continue their discussions to find a solution without court intervention.

A. The Onorato Report

The Onorato Report outlines the DNA analysis performed on a number of samples collected from Defendant's residence. This testing resulted in Onorato concluding to a reasonable degree of scientific certainty that (1) Talia is the source of DNA for several identified samples; and (2) female DNA is present in a number of identified samples. *See* Doc. No. 1051-2.

To determine the source of the DNA, a method of testing known as PCR/STR testing was employed, and to identify gender, PCR/amelogenin sex-typing was employed. These tests use a process known as the polymerase chain reaction, *i.e.*, "PCR", to amplify DNA at specific loci, *i.e.*, particular sites on a DNA strand. The PCR process results in a substantial number of specific, targeted segments of DNA than can be typed and compared. *See generally United States v. Davis*, 602 F. Supp. 2d 658, 664 (D. Md. 2009) (describing PCR analysis); *People v. Pizarro*, 216 Cal. App. 4th 658, 699-701 (Cal. Ct. App. 2013) (same). Specifically, the Onorato Report states that DNA was isolated from a number of samples taken from Defendant's residence, and "subjected to DNA typing using [PCR] at the amelogenin sex typing locus and the thirteen (13) different short tandem repeat (STR) loci of the AmpℓSTR® Profiler Plus™ *ID* and AmpℓSTR® Cofiler™ Amplification Kits." Doc. No. 1051-2 at 3.

The Onorato Report states that "[b]ased on the STR typing results and to a reasonable degree of scientific certainty, [Talia] is the source of the DNA obtained from specimens Q7, Q11, Q17, Q22, Q27, Q36, Q37, Q38, Q44, Q47, Q51, Q58-1, Q81-1, Q81-2, and Q88-1." *Id.* (footnote omitted). The Onorato Report further provides that "[t]he STR typing results for specimen Q5 indicate the presence of DNA from two or more individuals," that "to a reasonable degree of scientific certainty" Talia "is a major contributor," and that Defendant and Delilah Williams are excluded as potential minor contributors. *Id.* at 3. The Onorato Report explains that its conclusion that Talia is the source of these specimens "is based upon the outcome of a statistical calculation in which the probability of selecting an unrelated individual at random from an African American, Caucasian, Southeastern Hispanic, or Southwestern Hispanic population having a DNA profile matching the contributor (source/major/minor) of the DNA obtained from the questioned specimen(s) was determined to be equal to, or less than 1 in 6,000,000,000,000 [6 trillion] individuals."[3] *Id.* at 4 n.3.

[3] The Onorato Report also provides that "[b]ased on the STR typing results, the DNA profiles from specimen Q-1 match [Talia]" and that the "probability of selecting an unrelated individual at random having an STR profile matching the DNA obtained from the questioned specimen is approximately 1 in 320,000 from the African American population, 1 in 900,000 from the Caucasian population, 1 in 1.5 million from the Southeastern Hispanic population, 1 in 1.4 million from the Southwestern Hispanic population." Doc. No. 1051-2, Onorato Report at 3. Defendant and Delilah Williams were excluded. *Id.*

As for the typing results from the amelogenin locus for sex determination, the Onorato Report provides that "female DNA is present in the DNA obtained" in the same samples that Onorato identified as being from Talia. *Id.* at 4.

B. The Zervos Report

The Zervos Report explains that various samples were received, and that blood was identified in specimens Q5, Q11, Q17, Q30, Q36, Q38, and Q47. Doc. No. 1051-3, at 1-6. The Zervos Report further provides that a chemical test for the possible presence of blood was positive for specimens Q1, Q6, Q7, Q8, Q10, Q12 through Q16, Q19, Q21 through Q29, Q31 through Q35, Q37, Q39 through Q51, Q56, Q58, Q62 through Q67, Q81, Q82, and Q88, although the presence of blood was not confirmed for these samples. *Id.* at 6.

Although the Zervos Report does not explain her methodology, an FBI serology manual outlines that presumptive testing for blood is carried out using a phenolphthalein test -- a sample is rubbed with a cotton-tipped swab, a phenolphthalein solution is placed on the swab followed by hydrogen peroxide, and the appearance of pink color indicates the presumptive presence of blood. *See* Doc. No. 2043-1, Def.'s Mot. at 41-42 (quoting FBI serology manual). The confirmatory Takayama hemochromogen test procedure produces a positive result

where the ferrous iron from hemoglobin reacts with pyridine to create red feathery crystals of pyridine ferroprotoporphyrin. *Id.* at 51 (discussing FBI serology manual); *see also* National Forensic Science Technology Center, "Confirmatory Tests" *available at* http://www.nfstc.org/pdi/Subject02/pdi_s02_m02_02_b.htm (last visited August 23, 2013).

III. DISCUSSION

Defendant argues that several of the methodologies used in the Onorato and Zervos Reports are inadmissible pursuant to *Daubert*, Rule 403, and 18 U.S.C. § 3593(c). The court addresses these arguments in turn.

A. Admissibility Pursuant to *Daubert*

1. Standard

Federal Rule of Evidence 702 provides:

> 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.

The court has the responsibility of acting as a gatekeeper to prevent unreliable expert testimony from reaching the jury. *Daubert I*, 509 U.S. at 579. In

carrying out this responsibility, the court has discretion and flexibility in determining what evidence is relevant, reliable, and helpful to the trier of fact. *Cabrera v. Cordis Corp*., 134 F.3d 1418, 1420 (9th Cir. 1998); *United States v. Cordoba*, 104 F.3d 225, 228 (9th Cir. 1997) ("District Courts must strike the appropriate balance between admitting reliable, helpful expert testimony and excluding misleading or confusing testimony to achieve the flexible approach outlined in *Daubert*.") (quoting *United States v. Rincon*, 28 F.3d 921, 926 (9th Cir. 1994)).

The Ninth Circuit has articulated a two-prong analysis for admissibility. First, the proffered testimony must be reliable, *i.e*., the expert's testimony reflects scientific knowledge, the findings are derived by the scientific method, and the work product amounts to "good science." *Daubert v. Merrell Dow Pharm.*, 43 F.3d 1311, 1315 (9th Cir. 1995) ("*Daubert II*") (citation and quotation signals omitted). Second, the testimony must meet the "fit" requirement, *i.e.*, "it logically advances a material aspect of the proposing party's case."[4] *Id.*

For the reliability inquiry, the focus is on the expert's "principles and methodology, not on the conclusions that they generate." *Daubert I*, 509 U.S. at

[4] The second *Daubert* inquiry is not at issue in this action -- Defendant does not argue that the expert evidence at issue, if reliable, would fail to advance material aspects of the government's case. The court therefore outlines the relevant framework for the first prong only.

594-95. "Scientific evidence is deemed reliable if the principles and methodology used by an expert are grounded in the methods of science." *Clausen v. M/V New Carissa*, 339 F.3d 1049, 1056 (9th Cir. 2003). Accordingly, the expert's methods must be adequately explained. *United States v. Hermanek*, 289 F.3d 1076, 1094 (9th Cir. 2002); *see also Daubert II*, 43 F.3d at 1319 (holding that the expert must "explain the methodology . . . followed to reach [his or her] conclusions"); *United States v. Rincon*, 28 F.3d 921, 924 (9th Cir. 1994) (explaining that the methods used by the expert must be described "in sufficient detail" such that the district court can determine if they are reliable). "For scientific opinion, the court must assess the reasoning or methodology, using as appropriate such criteria as testability, publication in peer reviewed literature, and general acceptance, but the inquiry is a flexible one. Shaky but admissible evidence is to be attacked by cross examination, contrary evidence, and attention to the burden of proof, not exclusion." *Primiano v. Cook*, 598 F.3d 558, 564 (9th Cir. 2010) (footnotes omitted); *see also McDevitt v. Guenther*, 522 F. Supp. 2d 1272, 1291 (D. Haw. 2007) (citing *Daubert*, 509 U.S. at 593-95).

2. Application

Defendant argues that the methodologies used by the FBI in performing DNA and serology testing are unreliable and fail to survive *Daubert*

scrutiny. Based on the following, the court finds that Defendant's arguments attack the weight of the evidence, not its admissibility, and therefore this evidence is admissible pursuant to Rule 702 and *Daubert*.

a. Whether the Onorato Report used a proper method of DNA quantitation

A first step in the PCR analysis used in the Onorato Report is to determine the quantity of DNA in the specimen. Defendant argues that insufficient quantitation was conducted, calling into question the resulting PCR results (including the conclusions that certain samples were from Talia and/or from a female).

Specifically, Defendant argues that proper quantitation is necessary because using more or less than the optimum amount will produce unreliable results. Doc. No. 2043-1, Mot. at 28-29 (citing *United States v. Davis*, 602 F. Supp. 2d 658, 669 (D. Md. 2009)). The results of the PCR are shown on an electropherogram, which displays the pieces of DNA amplified as peaks, and which can be compared to other DNA samples. As one authority has explained, "[t]oo much DNA results in overblown electropherograms that make interpretation of results more challenging and time consuming to review. Too little DNA can result in loss of alleles due to stochastic amplification and failure to equally sample

the STR alleles present in the sample." *See* Doc. No. 2043-1, Mot. at 29 (citing John M. Butler, *Fundamentals of Forensic DNA Typing*, p. 111 (2010)).

Defendant further asserts that the two kits used by the government -- the Quantifiler Human DNA Quantification Kit and the Quantifiler Duo DNA Quantification Kit -- provide only ballpark figures of the amount of DNA and also vary between each other, which injects uncertainty into the results. *Id*. at 30-32. And according to Defendant, there is no evidence that any additional steps were taken to ensure proper quantitation, which at least one study recommends. *Id.* at 32-33 (discussing Robert O'Brien and Debra Figarelli, *Do You Know How Much DNA You Really Have?*).[5]

Despite these studies cited by Defendant suggesting that additional quantitation procedures are ideal, other studies have lauded the kits used in the Onorato Report for their superior sensitivity as compared to other tests. For example, other studies have acknowledged that the Quantifiler assay "performed well with the median value from participants coming close to the expected value." Doc. No. 2068-1, Heather LaSalle Decl. at 12-13 (citing reports). Heather LaSalle,

[5] Although Defendant provides a website address for this article (www.nfstc.org/?dl_id-217), the court was unable to find the article at this website. Ultimately, whether the article stands for the proposition Defendant cites it for does not affect the court's analysis.

FBI Forensic Examiner for the Nuclear DNA Unit,[6] further explains that an examiner can easily determine whether the proper amount of DNA was used by reviewing the resulting peaks of the DNA profile electropherogram. *Id.* at 13. If the improper amount of DNA was used, the examiner will observe poor DNA profiles and allele drop out. *Id.* But in the case of the samples tested in the Onorato Report, the DNA template level was not low (the DNA template of the samples ranged from 7.975 ng to 983 ng), and no stochastic effects were observed. *Id.* at 14. Rather, the PCR process was validated by (1) ensuring that the DNA peaks detected are true peaks; and (2) ensuring that any DNA peaks that may have stochastic effects are not utilized for matching purposes. *Id.*

Viewing the totality of the evidence presented, the court finds that Defendant's arguments go to the weight of the evidence, not its admissibility. The authorities presented by the parties establish at most that there are differing views as to the proper technique for DNA quantitation, and such alternative methodologies are the proper subjects of cross examination. *See Ruiz-Troche v. Pepsi Cola of Puerto Rico Bottling Co.*, 161 F.3d 77, 85 (1st Cir. 1998) ("*Daubert*

[6] In his Reply, Defendant asserts that the government failed to establish LaSalle's qualifications to provide an expert opinion. In response, the government provided LaSalle's CV and explained her credentials for providing an opinion. Doc. No. 2112. At the August 22, 2013 hearing, Defendant did renew his assertion that LaSalle was unqualified, and the court finds that LaSalle is qualified for purposes of this Motion.

does not require that a party who proffers expert testimony carry the burden of proving to the judge that the expert's assessment of the situation is correct. As long as an expert's scientific testimony rests upon good grounds, based on what is known, it should be tested by the adversary process -- competing expert testimony and active cross-examination -- rather than excluded from jurors' scrutiny for fear that they will not grasp its complexities or satisfactorily weigh its inadequacies." (citation and quotation signals omitted)); *see also Primiano*, 598 F.3d at 564 ("Shaky but admissible evidence is to be attacked by cross examination, contrary evidence, and attention to the burden of proof, not exclusion."). Accordingly, the court finds that the DNA quantitation techniques pass *Daubert* scrutiny.

b. Whether the Onorato Report properly considered that alleles at several loci have the same DNA length but different sequences

As stated in the Onorato Report, PCR STR DNA analysis was used to determine that to a degree of reasonable scientific certainty, Talia was the source of certain DNA samples. PCR STR DNA analysis looks for short tandem repeats -- *i.e.*, "STRs," which are sections of DNA in which three, four, or five base pairs are arranged in direct succession in a particular region, or locus, of a chromosome. *See Com v. Rosier*, 685 N.E.2d 739, 742 (Mass. 1997). Loci containing STRs are scattered throughout the chromosomes in large numbers. Such loci have a fairly large number of alleles and are usually capable of unique identification. *Id.* As

LaSalle explains, the basis of PCR STR DNA analysis is the ability to look at the length of these STRs, which in this case was performed at thirteen core STR loci. Doc. No. 2068-1, LaSalle Decl. at 15-16.

Defendant argues that PCR STR DNA analysis could potentially result in a false identification because it types only the length of the STR, not its actual DNA sequence, and certain STRs are known to have the same length but include different DNA sequences. Doc. No. 2043-1, Mot. at 34-37. Although Defendant acknowledges that some experts have rejected that this phenomena could cause an incorrect source identification, Defendant nonetheless argues that disregarding this possibility goes against the admonition that the failure to match at any *one* STR locus results in a non-match. *Id.* at 35. Defendant suggests that mass spectrometry could be performed to determine base composition, which would ensure that each STR locus is an actual match. *Id.* at 37.

Again, this argument goes to the weight that the government's evidence should be given, not its admissibility. PCR STR DNA analysis has been widely used for purposes of identification. This acceptance of PCR STR DNA analysis, without DNA sequence comparison, is supported by several experts opining that "it would not be probable for two people to match at all 13 core STR loci with only sequence differences." Doc. No. 2068-1, LaSalle Decl. at 16; *see*

also Pizarro, 216 Cal. App. 4th at 713 (determining that the "trial court did not abuse its discretion in finding that Myers followed correct scientific procedure by using STR procedure and not sequencing defendant's alleles to test for sequence variants" because the evidence established that "although STR procedure cannot discern sequence variants, its ability to discern length variants is extensive enough that a match at 13 loci is astronomically rare").

Because the PCR STR DNA analysis is an accepted methodology, the court rejects that this evidence should be excluded pursuant to *Daubert.*

c. Opinion testimony that Talia is the source of the DNA

Through the PCR STR DNA testing, Talia's DNA sample matched several samples collected from Defendant's residence -- *i.e.*, there was 100% concordance between all alleles of each unknown sample and those of a sample from Talia. A statistical analysis called Random Match Probability ("RMP") was subsequently conducted. *See* Doc. No. 2068-1, LaSalle Decl. at 2. Where the RMP statistics of a match are rarer than one in six trillion, the FBI will make a source attribution statement using the term "to a reasonable degree of scientific certainty." *Id.* at 2-3. In this case, the RMP statistic allowed such conclusion and the Onorato Report provides that "to a reasonable degree of scientific certainty," Talia was the source of several specimens collected from Defendant's residence.

Defendant argues that the court should find that this conclusion is "novel, unreliable, prejudicial, and conclusory." Doc. No. 2043, Mot. at 25. According to Defendant, testimony should be limited to the statistical estimates of match probability. In other words, Defendant seeks to limit the evidence to the statistical probability of a match -- *i.e.*, Onorato's statistical calculation in which he determined that "the probability of selecting an unrelated individual at random from an African American, Caucasian, Southeastern Hispanic, or Southwestern Hispanic population having a DNA profile matching the contributor (source/major/minor) of the DNA obtained from the questioned specimen(s) was [] to be equal to, or less than 1 in [6 trillion] individuals." Doc. No. 1051-2, Onorato Report at 4 n.3.

In making this argument, Defendant cites a number of authorities and laboratories that reject the use of source attribution. Defendant's expert Dan Krane Ph.D. explains that such evidence is not the product of reliable scientific principles because (1) there is no generally accepted formal, statistically-based definition of what constitutes a "reasonable degree of scientific certainty;" (2) the RMP analysis does not take into account the possibility of relatives in determining the profile match statistic; (3) the FBI did not take into account the possibility of laboratory error which could result in false positive results; and (4) RMP statistics do not

speak directly to the rarity of a DNA profile in all subpopulations and racial groups.[7] Doc. No. 2043-2, Krane Decl. at 3-10. In support of the conclusion that inferences of uniqueness are flawed, Defendant points to the fact that database searches have uncovered several instance in which entries match a high number of alleles (up to nine allelic matches), suggesting that the RMP statistical assumptions of uniqueness are flawed. Doc. No. 2043-1, Mot. at 16-19.

In opposition, the government explains that it followed basic RMP statistic methodologies, including when to make a source attribution statement, which is explained by various authorities (including the National Research Council's *The Evaluation of Forensic DNA Evidence* (1996) ("NRC II")), and has been adopted by the FBI and other laboratories. Doc. No. 2068-1, LaSalle Decl. at 2-3. LaSalle explains that the FBI and other laboratories use the term "to a reasonable degree of scientific certainty" in recognition that "not all current and previously living individuals' DNA profiles have (or could be) analyzed," and to communicate "how rare the calculated statistics are in relation to a given

[7] Defendant also argues that the opinion of whether a sample contains a particular individual's DNA is a legal, not factual and/or scientific decision, and therefore should be determined by the jury. Doc. No. 2043-1, Mot. at 8. The court rejects this argument out of hand. Whether Talia's DNA was found on certain items in Defendant's residence, as ascertained through DNA testing, is a factual determination based on scientific procedures not commonly understood by the general public. Expert testimony regarding these procedures and conclusions are well within the realm of expert testimony and do not involve a legal opinion.

population threshold." *Id.* at 3-5. As to the particular calculations in this action, the FBI followed the procedures outlined in the NRC II by calculating the RMP for unrelated individuals as well as for various familial relationships, and both Naeem Williams and Delilah Williams were tested and excluded as possible contributors of the samples. *Id.* at 5-7. Further, as discussed in the NRC II, error rates are not combined with the match probabilities; instead, the risk of error is considered on a case by case basis determined by the record of the laboratory performing the tests, the extent of redundancy, and the quality of the results. *Id.* at 9. Finally, LaSalle asserts that the partial matches found in database searches is unsurprising given that they were pairwise comparisons, which exponentially increases the opportunity to find partial matches. *Id.* at 8-9.

This court is not the first to be presented with these arguments. The court agrees with those other decisions finding that the source attribution determination is based on methods of science that can be adequately explained, *see Daubert II*, 43 F.3d at 1319 (holding that the expert must "explain the methodology . . . followed to reach [his or her] conclusions"), and that the jury should decide what weight to give this evidence based on these dueling expert opinions. *See, e.g.*, *United States v. McCluskey*, --- F. Supp. 2d ----, 2013 WL 3766686, at *44 (D. N.M. June 20, 2013) (determining that this "battle of experts"

regarding source attribution is for the jury to resolve); *United States v. Davis*, 602 F. Supp. 2d 658, 683-84 (D. Md. 2009) (determining that expert may opine that defendant was the source of the samples where the RMP calculation was sufficiently low to be considered unique); *People v. Cua*, 191 Cal. App. 4th 582, 600 (Cal. 2011) ("We know of no categorical prohibition, at least in this state, on source attribution -- expression by an otherwise qualified expert of an opinion that the quantitative and qualitative correspondence between an evidentiary sample and a known sample from a defendant establishes identity to a reasonable scientific certainty."); *see also Chischilly*, 30 F.3d at 1154 ("[T]he mere existence of scientific institutions that would interpret data more conservatively scarcely indicates a 'lack of general acceptance' under *Daubert*'s fourth factor.").[8] The

[8] Defendant cites various cases in support of the proposition that courts have refused to admit source attribution testimony. As an initial matter, Defendant overstates the proposed expert testimony -- the government does not propose to present testimony that Talia is the source of the DNA to the exclusion of everyone else in the world. Rather, the proffered testimony is that to a reasonable degree of scientific certainty, Talia is the source of the samples.

And in any event, Defendant's caselaw is ultimately unhelpful. As even Defendant recognizes, several of the cases he cites address firearms and ballistics identification, not DNA analysis. As explained in *McCluskey*, ballistics cases have excluded testimony of absolute weapon identification and instead have admitted language similar to the source attribution statement as in this case. 2013 WL 3766686, at *42. The other cases cited by Defendant involving DNA analysis do not address whether testimony of source attribution is admissible; rather, these cases have admitted testimony that the DNA samples match a particular individual. These courts reason that such testimony is admissible because this conclusion may be challenged through cross-examination. *See United States v. Williams*, 2010 WL 188233, at *3 (E.D. Mich. Jan. 15, 2010) ("Even if matching two out of thirteen loci does not provide conclusive evidence that the bloodstain at the house was that of the victim, it would seem to provide at least some evidence. The procedures from which this conclusion was drawn are scientifically sound; if

(continued...)

court therefore rejects that *Daubert* prevents the government from providing testimony that to a reasonable degree of scientific certainty, several samples collected from Defendant's residence are from Talia.

d. Opinion testimony that certain DNA samples came from a female

The Onorato Report explains that based on PCR analysis at the amelogenin sex typing locus, "female DNA is present in the DNA obtained from [several identified specimens]."[9] Doc. No. 1051-2, Onorato Report at 4. Defendant argues that this stand-alone amelogenin sex typing test is unreliable

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[8](...continued)
Defendants want to challenge Hutchison's conclusion, they are free to do so by cross-examining Hutchison or offering their own expert."); *United States v. Morrow*, 374 F. Supp. 2d 51, 65 (D. D.C. 2005) ("[T]he DNA evidence should be presented to the jury, which -- after cross-examination and careful consideration -- may afford it the weight that it is due.").

[9] An explanation of gender identification using the amelogenin sex typing locus is as follows:

> Gender identification (sex-typing) is commonly performed in conjunction with STR typing kit using PCR products generated from the amelogenin gene that occurs on both the X- and Y-chromosome. A commonly used PCR primer set first published by Sullivan et al. (1993) BioTechniques 15:637-641 targets a 6 bp deletion that occurs on the X-chromosome, which enables amplicons generated from the X- and Y-chromosome to be distinguished from one another when electrophoretic separation is performed to separate STR alleles. Most commercial STR kits utilize the Sullivan et al. (1993) primers or minor modifications. Since females are X,X, only a single peak is observed when testing female DNA whereas males, which possess both X and Y chromosomes, exhibit two peaks with a standard amelogenin test.

http://www.cstl.nist.gov/strbase/Amelogenin.htm (last visited August 23, 2013).

because, as outlined by his expert Dan Krane, Ph.D., (1) studies have reported anomalous mutations and deletions in sections of the Y chromosome, which may result in a sample from a male testing as a female;[10] and (2) the chance of a false result based on amelogenin sex typing is unknown at this time such that experts in the scientific community recommend including a test for an additional Y-chromosome as a control. Doc. No. 2043-1, Mot. at 23-28; *see also* Doc. No. 2043-2, Krane Decl. ¶¶ 23-30.

In opposition, LaSalle explains that these criticisms are inapplicable in this case because the government confirmed gender through a second test. Specifically, the FBI retested the samples using Quantifiler Duo Testing, which analyzes both human and human male DNA amounts, and analyzes both the amelogenin and the SRY regions (*i.e.*, another locus on the Y chromosome). Doc. No. 2068-1, LaSalle Decl. at 11. And this second test confirmed the results reported in the Onorato Report that the identified samples contained female DNA. *Id.*

Given that the government used a second control to determine gender -- the very suggestion provided in the literature cited by Defendants, *see* Doc. No.

[10] The deletion at the amelogenin locus is apparently rare, and occurs most often in Indian and Sri Lankan males, at the rate of 1.85% and 0.6 % respectively (compared with Austrian Caucasian males at the rate of 0.018%). *See* Doc. No. 2068-1, LaSalle Decl. at 10; *see also* Doc. No. 2043-1, Mot. at 24-25.

2043-1, Mot. at 24-25 -- there is no basis for the court to find that the methodologies used to determine that certain samples came from a female are unreliable. At the same time, however, the court recognizes that Defendant has not yet received discovery regarding this confirmatory test. The court therefore DENIES without prejudice Defendant's Motion, to the extent it attacks the reliability of the sex-typing based on the amelogenin testing only.[11]

e. Presumptive phenolphthalein blood testing

The Zervos Report provides that (1) blood was identified on certain samples, (2) a chemical test for the possible presence of blood was positive on other samples but the presence of blood was not confirmed, and (3) no blood was found on other samples. Doc. No. 1051-3. LaSalle explains that these conclusions are the result of two different tests. First, a presumptive test for the presence of blood was conducted, *i.e.*, a phenophthalein test, which is used by the FBI Laboratory to help narrow down the areas of interest which may then be tested by a confirmatory test and/or tested with PCR STR DNA analysis. Doc. No. 2068-1, LaSalle Decl. at 17-18. If a sample tested positive under this presumptive test, a

[11] At this time, the court need not determine whether amelogenin testing on its own is admissible for purposes of establishing sex.

confirmatory test (the Takayama Hemochromogen test) is required before the sample is identified as blood. *Id.* at 18.

Defendant argues that as numerous courts have found, results of phenolphthalein testing on their own, without any confirmatory testing, is inadmissible. Doc. No. 2043-1, Mot. at 42-45. Because the government asserts that it does not intend to introduce evidence of the phenolphthalein testing unless there was further confirmatory testing performed, Doc. No. 2068, Gov't Opp'n at 13, the court DEEMS MOOT Defendant's objection to this evidence.

f. Confirmatory Takayama blood testing

Defendant asserts that the confirmatory Takayama test fails *Daubert* scrutiny because (1) Zervos failed to photograph the resulting crystals of a positive result or otherwise document whether she followed the proper methodology; and (2) this test has not been validated, which is required for novel forensic methodologies. Doc. No. 2043-1, Mot. at 51-52.

The court rejects these arguments. The fact that Zervos did not photograph her results does not call into question her methodology or observations -- rather, she recorded her observations and she may testify regarding them. Further, the Takayama confirmatory test was developed between 1910 and 1912 and has become a standard confirmatory test for the presence of blood. Doc. No.

2068-1, LaSalle Decl. at 20-21. Given that serological tests are validated only when they are novel, the lack of recent validation of the Takayama confirmatory testing is unsurprising. And in any event, studies have been conducted establishing that false positives using the Takayama test are unlikely. *Id.* at 20. Thus, Defendant's arguments go to the weight of the evidence, not admissibility. The court therefore DENIES Defendant's Motion to exclude this evidence pursuant to *Daubert*.

B. Rule 403

Defendant also argues that the evidence is inadmissible pursuant to Rule 403, which provides that "[t]he court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence." "Rule 403 and *Daubert* address different aspects of evidence and therefore act independently." *United States v. Ramirez-Robles*, 386 F.3d 1234, 1246 (9th Cir. 2004). Regardless of the reliability of the evidence pursuant to *Daubert*, scientific evidence may be "excluded by Rule 403 if its probative value is outweighed by its prejudicial impact." *Id.*

As to the particular steps used in the DNA and serology testing, Defendant offers no reasoned explanation as to why their probative value is substantially outweighed by any unfair prejudice. Rather, as explained above, these methodologies are accepted by experts in the field and are used to provide relevant information regarding this criminal action. As a result, Defendant has failed to carry his burden of establishing that these methodologies should be excluded pursuant to Rule 403.

As to source attribution testimony, *Chischilly* explains that a jury may "assign undue weight to DNA profiling statistics even after hearing appellant's opposing evidence, the testimony of Government witnesses under vigorous cross-examination and the careful instructions of the district court on burdens of proof." 30 F.3d at 1156. Rule 403 therefore "requires judicial vigilance against the risk that such evidence will inordinately distract the jury from or skew its perception of other, potentially exculpatory evidence lacking not so much probative force as scientific gloss." *Id.* The court must guard against two general tendencies: "(1) that the jury will accept the DNA evidence as a statement of source probability (*i.e.*, the likelihood that the defendant is the source of the evidentiary sample); and (2) that once the jury settles on a source probability, even

if correctly, it will equate source with guilt, ignoring the possibility of non-criminal reasons for the evidentiary link between the defendant and the victim." *Id.*

The first concern stems from the fact that "[t]he FBI matching statistic does not represent source probability. Rather, the test results reflect the statistical probability that a match would occur between a randomly selected member of the database group and either the evidentiary sample or the [individual in question]." *Id.* at 1157. With that said, however, "statistical evidence derived from sample processing and match analysis, properly documented and performed in compliance with established, peer-reviewed laboratory protocols, is certainly probative of [the issues in the case]," and "[w]here the district court provides careful oversight, the potential prejudice of the DNA evidence can be reduced to the point where this probative value outweighs it." *Id.* at 1158.

In this action, the court has provided, and will continue to provide, oversight of the admission of the DNA evidence suggesting that Talia's blood and DNA were collected from various locations from Defendant's residence. This evidence will not be admitted in a vacuum, but instead will require expert explanation to the jury as to the methodologies and reasoning for the determinations that to a reasonable degree of scientific certainty, Talia is the source of several samples found in Defendant's residence. Further, this evidence is

probative of the allegations that Talia was the victim of child abuse and that such abuse caused her death. On its own, however, this evidence is not particularly prejudicial to Defendant -- it does not suggest that Defendant is guilty of these crimes. As a result, the second concern -- that the jury will mistakenly equate source with guilt -- does not weigh against admission. Thus, considering these issues together, the court finds that the probative value of the DNA evidence (and in particular, the source attribution determination) is not substantially outweighed by danger of undue prejudice.

C. 18 U.S.C. § 3593(c)

Defendant also seeks to exclude this evidence pursuant to 18 U.S.C. § 3593(c),[12] which addresses admission of evidence regarding aggravating factors during the penalty phase of a capital action. Because the government proposes to

[12] 18 U.S.C. § 3593 provides, in relevant part:

> (c) Proof of mitigating and aggravating factors. -- . . . At the sentencing hearing, information may be presented as to any matter relevant to the sentence, including any mitigating or aggravating factor permitted or required to be considered under section 3592. Information presented may include the trial transcript and exhibits if the hearing is held before a jury or judge not present during the trial, or at the trial judge's discretion. The defendant may present any information relevant to a mitigating factor. The government may present any information relevant to an aggravating factor for which notice has been provided under subsection (a). Information is admissible regardless of its admissibility under the rules governing admission of evidence at criminal trials except that information may be excluded if its probative value is outweighed by the danger of creating unfair prejudice, confusing the issues, or misleading the jury. . . .

introduce this evidence at issue during the guilt phase of trial, as opposed to the penalty phase, the court deems this argument premature. If this action reaches the penalty phase for a capital offense and the government seeks to present this evidence, Defendant may raise such objection at that time.

IV. CONCLUSION

Based on the above, the court DENIES Defendant's Renewed Motion to Exclude Expert Testimony Concerning the Identification of Biological Material [DNA and Serology], Doc. No. 2043, as to the issues addressed in this Order. The court has requested supplemental briefing regarding Defendant's argument that the Onorato Report failed to properly take into account the possibility of primer binding site mutations in performing PCR STR DNA comparative analyses between samples from Talia and those taken from the residence. After reviewing

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the supplemental briefing, the court will address this argument via a separate Order.

IT IS SO ORDERED.

DATED: Honolulu, Hawaii, August 26, 2013.

/s/ J. Michael Seabright
J. Michael Seabright
United States District Judge