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IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF CONTRA COSTA

THE PEOPLE OF THE STATE OF CALIFORNIA) No. 5-101049-5
)
)
11 Plaintiff,) MOTION TO EXCLUDE
) GUN SHOT RESIDUE
12) EVIDENCE
13 vs.)
)
14 STEVEN MIRANDA,)
) Date: October 3, 2012
15) Time: 8:30 a.m.
)
16 Defendant.) Dept.: TBA
)
_____)

17 TO: MARK PETERSON, DISTRICT ATTORNEY, CONTRA COSTA COUNTY,
18 MARTINEZ, CALIFORNIA; AND THE CLERK OF THE ABOVE ENTITLED
19 COURT:

20 PLEASE TAKE NOTICE that on October 3, 2012, or as soon thereafter as counsel
21 can be heard, Defendant Steven Miranda, through counsel, will move the court to
22 exclude expert testimony and evidence regarding gunshot residue collected from Mr.
23 Miranda.
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Said motion will be based on grounds that the evidence is unfairly prejudicial, and thus made inadmissible by Evidence Code § 352, and that the proposed evidence does not satisfy the *Kelly/Frye* test adopted by the California Supreme Court in *People v. Leahy* (1994) 8 Cal. 4th 587, 612.

Said motion will be based on this notice, the attached memorandum of points and authorities, and any evidence, oral or documentary, that would be adduced at the hearing of this motion.

Dated:October 3, 2012

Respectfully submitted,

Rebecca Brackman
Attorney for Defendant

1 MEMORANDUM OF POINTS AND AUTHORITIES

2 STATEMENT OF THE FACTS

3 On August 20, 2009, police responded to a shooting at 12889 San Pablo Avenue.
4 Witnesses stated that a gunman had entered the bar and fired multiple shotgun rounds
5 in the bar. As reflected in the police reports, officers Martin and Grivetti collected a
6 gunshot residue ("GSR") kit from Mr. Miranda and the three other suspects. The kits
7 were then sent to the Los Angeles County Department of the Coroner for analysis.
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9 Margaret A. Kaleuati, a criminalist at the Los Angeles County Coroner's Office,
10 tested the particles collected from Mr. Miranda using Scanning Electron Microscopy /
11 Energy Dispersive Spectroscopy ("SEM/EDS"). She discovered no particles consistent
12 with GSR on Mr. Miranda's right hand, his dominant hand, and particles containing
13 only antimony and lead in the sample taken from Mr. Miranda's left hand. The
14 Coroner's Office did not test residue from the casings found at the scene to compare to
15 residue seized from Mr. Miranda.
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17 Ms. Kaleuati determined that the particles on Mr. Miranda's left hand were
18 consistent with GSR, and theorized that he had either: discharged a firearm, been in an
19 environment with GSR, or received the particles from an environmental source. No
20 GSR was detected in the samples taken from the other three suspects.
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1 ARGUMENT

2 Mr. Miranda requests that the Court exclude evidence and expert testimony
3 regarding alleged GSR collected from him. New scientific research has revealed that
4 GSR analysis is no longer generally accepted by the relevant scientific community as
5 valid. Further, the Los Angeles County Coroner’s Office did not even adhere to the few
6 general protocols required by the relevant scientific community. Therefore, under the
7 *Kelly/Frye* test adopted in adherence with California Rules of Evidence 720 and 801, this
8 evidence is inadmissible.
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10 In the alternative, even if this Court accepts the results of the GSR analysis as
11 valid, they are inconclusive as to Mr. Miranda’s involvement in the offense.
12 Accordingly, any GSR evidence that the state may seek to admit is not probative of
13 guilt. Because juries consider forensic evidence scientifically viable and tend to rely on
14 it regardless of its proclaimed accuracy, the introduction of even inconclusive results
15 may unfairly prejudice Mr. Miranda or mislead the jury. (Leiberman, J. et. al. (2008)
16 *Gold v. Platinum, Do Jurors Recognize the Superiority and Limitations of DNA Compared to*
17 *Other Types of Forensic Evidence?* Psychology, Public Policy and Law Vo.14. No.1 27-62.)
18 Therefore, the GSR lab results’ probative value is substantially outweighed by the
19 danger of unfair prejudice and misleading the jury, and are inadmissible under
20 California Evidence Code section 352. (CAL. EV. CODE § 352.)
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1 **I. GUNSHOT RESIDUE ANALYSIS IS NOT GENERALLY ACCEPTED**
2 **BY THE RELEVANT SCIENTIFIC COMMUNITY, AND IS THUS**
3 **INADMISSIBLE UNDER THE KELLY/FRYE TEST.**

4 Despite the longstanding use of GSR evidence, the prosecution bears the burden
5 of proving that the investigators and crime lab personnel who collect and test the GSR
6 have employed generally accepted scientific procedures in conducting the test and
7 interpreting the results. (*See People v. Kelly* (1976) 17 Cal.3d 24, 30; David L. Faigman et
8 al. (2008) *Modern Scientific Evidence: The Law & Science of Expert Testimony*.) To prove
9 that a procedure has been generally accepted, the prosecution must demonstrate that it
10 has been validated by the relevant scientific community. (*Ibid.*) The relevant scientific
11 community includes only those most qualified to evaluate the methods, not merely
12 police officers in charge of administering the test. (*United States v. Horn* (D. Md. 2002)
13 185 F. Supp. 2d 530, 554.) Here, those scientists who have conducted research on the
14 reliability of the current methods for extracting and testing GSR residue have found
15 that, despite the widespread adoption of the SEM/EDS system, GSR analysis is
16 deficient. (Dalby, O., Butler, D. and Birkett, J.W. (2010) *Analysis of Gunshot Residue and*
17 *Associated Materials – A Review*, Journal of Forensic Sciences, Volume 55, 924, 940.)
18 19

20 They have found that GSR testing is not validated because: 1) GSR can be easily
21 transferred between surfaces, thus creating a risk of false identifications; 2) labs cannot
22 adequately distinguish GSR from false positives; 3) there has been proven
23 contamination of labs, crimes scenes, and police vehicles; 4) lab technicians do not
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1 consider circumstantial evidence in classifying particles as GSR. Accordingly, only a
2 case-by-case method, which employs statistical evaluation can reliably indicate a
3 suspect's relationship to gunshot residue. (*Ibid.*)

4 **A. Gunshot residue can be easily transferred to non-shooters and**
5 **those not present at crime scenes.**

6 Scientists do not consider GSR testing reliable because no test exists that can
7 distinguish between gunshot residue collected by a shooter and GSR collected through
8 accidental contact. (See Wright., Diana M., Trimpe, Michael A. (2006) *Summary of FBI*
9 *Laboratory's Gunshot Residue Symposium*, Forensic Science Communications, Volume 8,
10 Number 3. (finding that there is no test that distinguishes between GSR collected from
11 discharge and from mere contact).) When an individual discharges a firearm, the gun
12 ejects a plume of particulate material in different directions. (Schwoeble, AJ., Exline,
13 DL. (2000) *Current Methods in Forensic Gunshot Residue Analysis*. Boca Raton, FL: CRC
14 Press.) These particles, called GSR, ordinarily contain lead styphnate, barium nitrate,
15 and antimony sulfide. (*Ibid.*) Depending on the weapon, GSR may be deposited up to
16 18 meters from the firearm. (Wolten, GM., Nesbitt RS, Calloway AR. (1979) *A Particle*
17 *Analysis for the Detection of Gunshot Residue*, Journal of Forensic Sciences, Volume 24,
18 106-107.) Once deposited on a person or surface, it can remain for up to 2 months.
19 (Dalby, O., et. al. (2010) *Analysis of Gunshot Residue and Associated Materials – A Review*,
20 *supra* at 939.)
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1 Any individual who comes into contact with the surface or individual containing
2 GSR during this time period may collect GSR by touching it. (Wright., Diana M.,
3 Trimpe, Michael A. (2006) *Summary of FBI Laboratory's Gunshot Residue Symposium*,
4 *Forensic Science Communications*, Volume 8, Number 3. (Confirming that individuals
5 with previously clean hands can collect GSR particles by coming into contact with
6 police officers and vehicles).) The SEM/EDS test currently used by most labs, including
7 the Los Angeles County Coroner's Office, cannot distinguish between GSR transferred
8 from a surface or an individual and that collected while discharging a firearm because
9 GSR can travel between surfaces. (Caddy, B., *Gunshot Residue Analysis: A Review*,
10 *Journal of Forensic Sciences*, Volume 42, Issue 4.) Further, because forensic examiners
11 do not always take control samples from crime scenes to determine the risk of
12 transferring GSR, there is no way to calculate whether or not it is likely GSR has been
13 transferred to a suspect. (See Generally Dalby, O., et. al. (2010) *Analysis of Gunshot*
14 *Residue and Associated Materials – A Review, supra* at 939.)

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17 The fact that GSR can persist for weeks or even months also makes it difficult for
18 analysts to distinguish between old GSR collected from previous incidents and GSR
19 attributable to the incident in question. (*Ibid.*) The risk is even greater when clothing is
20 taken off and stored after exposure to GSR. (*Ibid.*) Accordingly, unlike DNA evidence
21 found at the scene of a crime or on an individual, the presence of GSR on a person does
22 not prove that the person had been in the vicinity of the crime scene. (*GSR Transfer to*
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1 *Paper Bag Hand Covers* (2001) International Association for MicroAnalysts Newsletter,
2 Volume 2, Issue 1.) For this reason, the relevant scientific community has found that the
3 presence of gunshot residue on a suspects' hand does not prove that he or she has fired
4 a gun or even been present when the firearm was discharged. (See Dalby, O., et. al.
5 (2010) *Analysis of Gunshot Residue and Associated Materials – A Review, supra*; Wright.,
6 Diana M., et. al. (2006) *Summary of FBI Laboratory's Gunshot Residue Symposium*, Forensic
7 Science Communications, *supra*.)

9 **B. Other organic and inorganic materials can be mistaken for GSR.**

10 False positives skew the results of GSR testing. Stud guns, cap guns, blanks, lead
11 smelting, car brakes, acid batteries, exhaust filters, and fireworks all produce GSR-like
12 materials. (Wallace, J.S., McQuillan J. (1984) *Discharge Residues from Cartridge-Operated*
13 *Industrial Tools*, Science and Justice Journal, Volume 24, Issue 5, 495-508; Dalby, O., et. al.
14 (2010) *Analysis of Gunshot Residue and Associated Materials – A Review, supra* at 934-936.)
15 Researchers have found that an individual can collect particles of the same, size, shape,
16 and chemical composition of GSR by touching other inorganic materials. (Dalby, O., et.
17 al. (2010) *Analysis of Gunshot Residue and Associated Materials – A Review, supra* at 934-
18 936.) In addition, the environment produces organic compounds that can be mistaken
19 for GSR including pesticides, dyes, apple trees, and veterinarian medicines. (*Ibid.*) In
20 one study, researchers used the SEM/EDS method to test the hands of individuals
21 working in areas with GSR-like particles. (Wolten, G.M., et. al. (1979) *A Particle Analysis*
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1 *for the Detection of Gunshot Residue*, Journal of Forensic Sciences, *supra.*) While none
2 produced particles unique to GSR, some found particles indicative of GSR with the
3 same spherical shape and size. (*Ibid.*)

4 For this reason, some experts have announced that examiners must collect
5 residue from ammunition and compare its chemical composition with residue seized
6 from a suspect in order to accurately identify a particle as GSR. (Romolo, F.S., Margot
7 P. (2001) *Identification of Gunshot Residue: A Critical Review*. Forensic Science
8 International, Volume 119: 195-211.) These scientists reason that, without a basis of
9 comparison, there is no way of knowing whether the firearm discharged a lead based
10 particle or lead-free ammunition, which has become increasingly popular. (John
11 Simpson, Crime Scene Investigations: *Gunshot Residue Analysis on A Single Gunpowder*
12 *Particle*, Science Daily, Apr. 8, 2008,
13 www.sciencedaily.com/releases/2008/04/080407074558.) Accordingly, there is still
14 significant dispute as to how to account for false contaminants.
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17 **C. Crime labs, police vehicles, and investigators can become**
18 **contaminated with GSR, thus compromising the results of GSR**
19 **tests.**

20 Police vehicles may contain GSR. In a test conducted by the Los Angeles County
21 Coroner's Office, researchers found GSR in 45 out of 50 samples from police vehicles
22 tested. (*Summary of FBI Laboratory's Gunshot Residue Symposium*, Forensic Science
23 Communications, *supra.*) The Colorado Bureau of Investigations conducted a similarly
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1 study, and found at least one particle characteristic of GSR in 14 out of 26 vehicles
2 tested. (*Ibid*) A suspect may also collect GSR from handcuffs. In one case study, 41
3 participants who had previously tested negative for GSR were handcuffed and then
4 retested. (*Ibid.*) Of those 41, nearly half had collected more than five two component
5 particles, and four had collected a three-component particle, leading the author of the
6 study to conclude that a GSR particle could be transferred from handcuffs or a police
7 officer. (*Ibid.*) Loose GSR contaminate has even ended up in the labs where police send
8 samples to be tested. (*Ibid.*) In fact, in one study, a crime lab identified “hot zones”
9 within the lab where GSR contaminant would be most likely to be found. (*Ibid.*)
10 Accordingly, if a suspect or his GSR sample comes into contact with contaminant, the
11 SEM/EDS test could produce a false positive.

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14 **D. The relevant scientific community has not accepted a validated**
15 **method for interpreting GSR.**

16 Scientists have agreed that the adoption of the SEM/EDS testing method has
17 increased crime labs accuracy in determining the presence of certain elements, which,
18 when fused into a spherical particle, are characteristic of GSR. However, scientists have
19 not validated or agreed upon what conclusions to draw from the results of the
20 SEM/EDS test or whether these conclusions are reliable.

21 In 2006, the FBI held a Symposium on gunshot residue evidence. (*Ibid.*)
22 Representatives from crime labs across the country attended. (*Ibid.*) The stated mission
23 of the symposium was to establish guidelines for accepted practice in GSR testing.
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1 (*Ibid.*) The attendees' first task was to define what particles constitute GSR. (*Ibid.*) They
2 generally agreed that GSR is a spheroid particle containing lead, antimony, and barium.
3 (*Ibid.*) However, only four participants could agree that this chemical composition was
4 unique to GSR. (*Ibid.*) The participants also acknowledged that, while two component
5 particles should be noted in lab reports, they can only be commonly associated with,
6 not characteristic of GSR. (*Ibid.*)
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8 The examiners also addressed the problem of GSR transfer. The majority agreed
9 that GSR can transfer from one surface to another, and recognized that there is no
10 method for distinguishing between transferred GSR and GSR collected during
11 discharge. (*Ibid.*) The majority also concluded that there is a heightened risk of GSR
12 transfer because suspects come into contact with police, who have a greater risk of
13 being exposed to GSR than the general public. (*Ibid.*) However, the participants of the
14 symposium could not agree on a way to distinguish GSR collected from a shooter and
15 that transferred from law enforcement. (*Ibid.*) The only solution suggested was to
16 require that police officers carry ammunition detectable by SEM/EDS and thus
17 distinguishable from residue left by non-police personnel, an approach only tested
18 outside the United States. (*Ibid.*)
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21 The symposium also addressed what conclusions to draw from GSR. The
22 participants agreed that the presence of GSR does not prove that an individual
23 discharged a weapon. (*Ibid.*) Most also agreed that reports must qualify any statements
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1 about gunshot residue since even analysis done through the SEM/EDS system cannot
2 prove that an individual has fired a gun or was even present at the scene. (*Ibid.*)

3 Scholars and scientists have weighed in on the conclusions reached by the
4 quorum of gunshot residue examiners who participated at the symposium. In 2010, a
5 group of post-doctoral fellows and scientists conducted a systematic evaluation of
6 gunshot residue analysis and scientific studies published on GSR. (Dalby, O., et. al.
7 (2010) *Analysis of Gunshot Residue and Associated Materials – A Review, supra* at 939.) They
8 found that the current system for classifying GSR, which categorizes particles as
9 characteristic, consistent or indicative of GSR, is problematic. They reasoned that this
10 system neglects a detectable probability that particles are more likely transferred
11 particles or contaminates. (*Ibid.*) In fact, some participants at the FBI symposium
12 agreed that labs should consider other factors in interpreting the results of the SEM/EDS
13 test. (*Summary of FBI Laboratory’s Gunshot Residue Symposium, Forensic Science*
14 *Communications, supra.*)

15 After a review of the current techniques, tests performed, and academic
16 scholarship on GSR, the scientists suggested that a better approach to GSR
17 interpretation would be a case-by-case methodology that uniquely classifies a particle
18 based on comparison to other items collected at the crime scene or the known
19 environment of the suspect. (Dalby, O., et. al. (2010) *Analysis of Gunshot Residue and*
20 *Associated Materials – A Review, supra* at 939.) This would enable analysts to more
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1 accurately determine the probability that GSR is transferred or that a particle, while
2 characteristic of GSR, has a different source. (*Ibid.*)

3 Perhaps the most telling sign that the GSR residue analysis process is not
4 scientifically validated is that the FBI, which hosted the 2006 symposium on GSR, has
5 disbanded its own gunshot residue testing lab amidst rumors of contamination. (Julie
6 Bykowitz, *In Priority Shift, FBI Halts Gunshot Residue Analysis*, Los Angeles Times, May
7 28, 2006, <http://articles.latimes.com/2006/may/28/nation/na-fbi28>.) Both scientists and
8 gunshot residue analysts are unsure of how results should be interpreted in light of the
9 fact that the actual source of GSR can never be known. (*Summary of FBI Laboratory's*
10 *Gunshot Residue Symposium*, Forensic Science Communications, *supra.*; *See Generally*
11 *Dalby, O., et. al. (2010) Analysis of Gunshot Residue and Associated Materials – A Review,*
12 *supra* at 939.) Laboratories have yet to accept or incorporate reforms proposed by
13 scientists that could improve the process. (*Ibid.*) In fact, those crime labs that
14 participated in the 2006 FBI symposium could not even reach a consensus on what
15 constitutes GSR. (*Summary of FBI Laboratory's Gunshot Residue Symposium*, Forensic
16 Science Communications, *supra.*) Accordingly, there is no general acceptance in the
17 scientific community on a validated method of interpreting the results of a GSR test.

21 **E. This Court must reevaluate the general acceptance of gunshot**
22 **residue evidence in light of the above findings.**

23 More than thirty years ago, a California appellate court found that GSR residue
24 testing was a reliable scientific technique. (*People v. Palmer* (1978) 80 Cal.App.3d 239,
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1 239.) In *People v. Palmer*, the court approved the SEM/EDS technique currently used by
2 GSR analysts. (*Ibid.*) It cited several studies, one claiming that SEM/EDS testing is
3 always successful in identifying GSR on hands tested immediately after a shooting, as
4 proof that the SEM/EDS technique is generally accepted within the scientific
5 community. (*Id.* at 252.) The court acknowledged the problem of sample
6 contamination, but dismissed the concern as outdated. (*Id.* at 253.) It also found that
7 the error rate of interpretation was irrelevant because a *Kelly* analysis only requires a
8 review of the methodology used, not the weight of the evidence. (*Ibid.*)

10 Today, while the majority of forensic scientists agree that SEM/EDS analysis is
11 the most effective method for testing GSR, they have rejected the idea that it is always
12 successful. (*Summary of FBI Laboratory's Gunshot Residue Symposium*, Forensic Science
13 Communications, *supra.*; See Generally Dalby, O., et. al. (2010) *Analysis of Gunshot Residue*
14 *and Associated Materials – A Review*, *supra* at 939.) Further, almost all agree that
15 contamination is a problem. (Dennis L. McGuire, M.S., *The Controversy Concerning*
16 *Gunshot Residue Examinations*, Forensic Magazine, Aug. 1, 2008,
17 [http://www.forensicmag.com/article/controversy-concerning-gunshot-residues-](http://www.forensicmag.com/article/controversy-concerning-gunshot-residues-examinations?page=0,2)
18 [examinations?page=0,2](http://www.forensicmag.com/article/controversy-concerning-gunshot-residues-examinations?page=0,2).) Scientists have also voiced concern that residue transfer,
19 which the *Palmer* court did not consider, poses a grave risk of false GSR identifications.
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21 (*Summary of FBI Laboratory's Gunshot Residue Symposium*, Forensic Science
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1 Communications, *supra.*; See Generally Dalby, O., et. al. (2010) *Analysis of Gunshot Residue*
2 *and Associated Materials – A Review, supra* at 939.)

3 The relevant scientific community has also since rejected the *Palmer* court's
4 distinction between the method of testing and the interpretation of the results.
5 Scientists have found that classification systems that arbitrarily distinguish between
6 GSR, GSR transfer, and GSR-like materials are problematic because they do not provide
7 statistical probabilities that the particles collected are in fact GSR, and that the suspect
8 who provides the sample is the source. (See Generally Dalby, O., et. al. (2010) *Analysis of*
9 *Gunshot Residue and Associated Materials – A Review, supra* at 939.)

11 Similarly, the California Supreme Court has rejected the *Palmer* court's reasoning,
12 finding that the process of attributing the test results to the suspect is part of the
13 methodology considered under *Kelly*. (*People v. Venegas* (1998) 18 Cal.4th 47, 82.
14 (providing that the second step of DNA analysis is comparing the DNA match to that
15 found at the crime scene).) In *People v. Venegas*, the Court reasoned that evidence that
16 jurors cannot see – such as DNA – requires technical interpretations by experts and thus
17 must be resolved under *Kelly*. (*Id.* at 81.) GSR, like DNA, is particulate material that
18 jurors cannot see. Jurors cannot evaluate GSR for themselves as they can with
19 fingerprints or other forensic evidence visible to the naked eye. Therefore, since the
20 SEM/EDS system does not reveal the source of the GSR, juries would be forced to
21 speculate on where the GSR came from. GSR analysis fails the *Kelly/Frye* test not
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1 because the SEM/EDS system incorrectly identifies GSR-like particles – which it actually
2 does not seem to do – but rather because it cannot determine their source.

3 Despite these discoveries, no California court has reconsidered *Palmer* in light of
4 this evidence. Instead, courts have merely regurgitated the language of *Palmer*, and
5 asserted that because the SEM/EDS system is still in place, the *Palmer* court’s reasoning
6 remains sound. As the California Supreme Court elaborated in *People v. Leahy*, the fact
7 that police have previously used a technique and courts have admitted it, does not
8 preclude a reassessment of its reliability in light of new scientific evidence. ((1994) 8
9 Cal.4th 587, 605-607; *See also People v. Kelly* (1976) 17 Cal.3d 24, 30 (holding that “courts
10 should not follow precedent that does not reflect the changing attitude of the scientific
11 community.”); *See also People v. Venegas*, 18 Cal.4th at 53 (providing that, upon a
12 showing of new scientific evidence, courts need not blindly accept its prior judicial
13 approval).)

14 Courts in other states have begun to reassess whether GSR evidence is still
15 reliable. A district state court in Minnesota recently acknowledged the shortcomings of
16 gunshot residue evidence, throwing out GSR evidence, and reasoning that significant
17 questions exist in the scientific community about its validity. (Dave Orrick, *Anoka, MN*
18 *Judge Rejects Gunshot Residue Evidence*, Pioneer Press, Jul. 13, 2006,
19 <http://truthinjustice.gsr-reject.htm>.) Likewise, a Maryland trial court judge excluded
20 testimony about a two-element particle, which the crime lab had identified as GSR.
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1 (Julie Bykowitz, *City Judge Rejects Gun Residue Evidence*, Baltimore Sun, February 23,
2 2005,
3 http://www.nlada.org/forensics/for_lib/Documents/1112127938.82/BaltSunGSRII.html.)

4 California courts have also recognized the need to reconsider the admissibility of
5 forensic evidence once considered sound when new scientific evidence arises. In *People*
6 *v. Leahy*, the Court found that *Kelly* applied to the Horizontal Gaze Nystygmus Test
7 despite the fact that the test had been previously used by police and admitted by courts.
8 (8 Cal. 4th at 587.) As recent as 2004, California courts have considered techniques such
9 as fingerprint examinations and DNA “new” for the purposes of *Kelly*, and thus ripe for
10 review. (*People v. Sinaiko* (2004) 122 Cal.App.4th 1133.) As one court has pointed out,
11 “science moves inexorably forward and hypotheses or methodologies once considered
12 sacrosanct are modified or discarded. The judicial system, with its search for the closest
13 approximation to the ‘truth’, must accommodate this ever-changing scientific
14 landscape.” (*State v. Behn* (N.J. Super.A.D. 2005) 868 A.2d 329, 343.) Accordingly, if this
15 Court finds that the relevant scientific community is unsettled on GSR testing, it must
16 exercise its discretion and exclude it from trial.
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20 **F. Even if the Court accepts the invalidated methodology used by**
21 **most crime labs, the Los Angeles County Coroner’s Office did not**
22 **follow this protocol.**

23 The *Kelly/Frye* test requires not only that there is a generally accepted method of
24 testing scientific evidence, but that the crime lab personnel who collect and test the GSR
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1 have employed that method in conducting the test and interpreting the results. (*People*
2 *v. Kelly* (1976) 17 Cal.3d 24, 30; David L. Faigman et al., *Modern Scientific Evidence: The*
3 *Law & Science of Expert Testimony* (2008).) Even if this Court finds the current practice of
4 GSR examiners scientifically valid, the Los Angeles County Coroner's Office deviated
5 from that practice. The majority of GSR examiners at the FBI conference, and the
6 scientists who have researched GSR have found that two particle compounds do not
7 constitute GSR. (*Summary of FBI Laboratory's Gunshot Residue Symposium, Forensic*
8 *Science Communications, supra.*; See Generally Dalby, O., et. al. (2010) *Analysis of Gunshot*
9 *Residue and Associated Materials – A Review, supra* at 939.) Most participants at the FBI
10 symposium agreed that they would note the presence of such particles in their reports,
11 but qualify them as those "commonly associated" with GSR. (*Summary of FBI*
12 *Laboratory's Gunshot Residue Symposium, Forensic Science Communications, supra.*)
13 Others who have conducted studies have found that, because two element particles are
14 more likely to be false positives than three element particles, they should be classified
15 separately. (Michael Trimpe, *The Current Status of GSR Examinations, FBI Law*
16 *Enforcement Bulletin*, May, 2011, [http://www.fbi.gov/stats-services/publications/law-](http://www.fbi.gov/stats-services/publications/law-enforcement)
17 [enforcement](http://www.fbi.gov/stats-services/publications/law-enforcement-bulletin/may_2011/The%20Current%20Status%20of%20GSR%20Examinations.)
18 [bulletin/may_2011/The%20Current%20Status%20of%20GSR%20Examinations.](http://www.fbi.gov/stats-services/publications/law-enforcement-bulletin/may_2011/The%20Current%20Status%20of%20GSR%20Examinations.))
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22 The particles collected from Mr. Miranda's left hand only contained two of the
23 elemental particles required for a finding of GSR. However, the Los Angeles County
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1 Coroner's lab report classifies them as "consistent with GSR" as opposed to "commonly
2 associated" with GSR. Even the Scientific Working Group for Gunshot Residue, an
3 organization comprised almost entirely of investigators working with police, does not
4 list this chemical composition as consistent with GSR. (*Guide for Primer Gunshot Residue*
5 *Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry*,
6 Developed by Subcommittee: E30.01 ASTM Book of Standards Volume: 14.02,
7 swggsr.org pp.97 and 100.)

9 Here, the prosecution alleges that Mr. Miranda rode with three other individuals
10 in a car from the scene of the incident to the house where police ultimately located
11 them. Under this theory, Mr. Miranda would have been in close contact with others
12 who could have collected GSR. The police report also states that the house where police
13 located the suspects contained a number of guns, and that the suspects were burning
14 clothing in the garage. Mr. Miranda could have collected GSR from either the burned
15 clothing or from another gun without being involved in the incident. Further, the lab
16 failed to consider the fact that Mr. Miranda is right-handed, and that because GSR was
17 only found on his left hand and not his right, it is less is less likely that he discharged a
18 firearm. There is significant chance of contamination during the collection process also.

21 Nevertheless, the Los Angeles County Coroner's Office used a boilerplate
22 classification system. Its report states that Mr. Miranda could have either discharged a
23 firearm, been in an environment of gunshot residue, or received this particles from an
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1 environmental source. Scientists who have studied this practice have found that
2 analysts should not make arbitrary distinctions such as these because they do not rely
3 on statistical probability. (Dalby, O., et. al. (2010) *Analysis of Gunshot Residue and*
4 *Associated Materials – A Review, supra* at 939.) Given the evidence the crime lab had
5 access to and the chemical composition of the particles collected, the lab should have
6 been able to make a more informed assessment of the GSR or none at all.
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8 In fact, the Los Angeles County Coroner's Office's classification in this case
9 demonstrates the danger of using a system that does not distinguish between GSR in
10 different cases. Not only did the lab ignore circumstantial evidence demonstrating that
11 the collection of GSR from discharge was questionable, but it unfairly suggests this by
12 listing collection from discharge as the first possible explanation of the presence of
13 alleged GSR. The protocols for the LA County Coroner's Office also show a bias in
14 favor of calling negative results as inconclusive, and reporting positive GSR results, no
15 matter what conflicting non-GSR particles are present.
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17 The method employed here is distinguishable from the test used by the GSR
18 analyst in *People v. Palmer*. In *Palmer*, the GSR analyst corroborated the results of the
19 SEM/EDS test by comparing the GSR collected from the suspect to GSR found in empty
20 ammunition casing at the crime scene. (80 Cal.App.3d at 239.) The GSR analyst
21 identified the chemical composition of both as identical, and therefore was able to
22 determine that the GSR came from the same gun. (*Ibid.*) Here, the Coroner's Office
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1 found alleged GSR only on Mr. Miranda's left hand and did not test casings from the
2 scene. Therefore, it had no basis for comparison, and no way to know whether the GSR
3 was deposited from the weapon used during the incident or during a previous incident.

4 The Los Angeles County Coroner's Office did not adequately consider the
5 surrounding circumstances of the collection of GSR nor did it account for the risk of
6 contamination. It does not document or report presence of conflicting non-GSR
7 particles which might demonstrate an environmental or other source for the elemental
8 particles. Further, it used a flawed classification system. Accordingly, its determination
9 that Mr. Miranda could have discharged a firearm is based on a misapplication of an
10 industry-approved methodology. It did not do a complete analysis, which involves
11 residue from test firings to residue collect to see if it shares a similar chemical
12 composition, and considering the whole picture of non-GSR particles present in the
13 evidence sample. Therefore, even if this industry standard is deemed to be reflective of
14 the generally accepted scientific community, the results are inadmissible under the
15 *Kelly/Frye* test.
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19 **II. INTRODUCING THE RESULTS OF THE GSR TEST WOULD**
20 **UNFAIRLY PREJUDICE MR. MIRANDA AND CONFUSE THE JURY,**
21 **THERBY VIOLATING CALIFORNIA EVIDENCE CODE SECTION**
22 **352.**

23 California Evidence Code section 352 states that a court may exclude evidence
24 when its probative value is substantially outweighed by the danger of unfair prejudice
25 or misleading the jury. (CAL. EV. CODE § 352.) Accordingly, this Court has discretion

1 to decide whether the results of a scientific experiment will confuse jurors, and thus be
2 inadmissible under Section 352. (*See People v. Skinner* (1954) 123 Cal.App.2d 741, 750.)

3 The results of Mr. Miranda's GSR test have minimal probative value. Because of
4 the inherent unreliability of the GSR testing method, and the fact that the Los Angeles
5 County Coroner's Office's failed to follow industry standards, the results of the GSR
6 test do not demonstrate that Mr. Miranda fired a gun or was even in close proximity to
7 the crime scene. Even taken face value, the results do not prove that Mr. Miranda fired
8 the gun, mentioning that they could have come from environmental sources.

9
10 However, they do gravely prejudice Mr. Miranda and potentially mislead the
11 jury. Research shows that jurors have difficulty evaluating scientific methodologies for
12 accuracy. (Leiberman, J., Carrel, C., Miethe, T., Krauss., D. et. al. "Gold v. Platinum, Do
13 Jurors Recognize the Superiority and Limitations of DNA Compared to Other Types of
14 Forensic Evidence?" *Psychology, Public Policy and Law* 2008 Vo.14. No.1 27-62.) The
15 results of the GSR test conducted here, which do not account for the risk of transfer or
16 contamination, would be especially difficult for a jury to decipher. Yet, regardless of
17 understanding, jurors ascribe a higher value to forensic evidence than other forms of
18 evidence. (*Ibid.*) In one study, researchers found that jurors consider the same forensic
19 evidence more persuasive when used to incriminate an individual as opposed to
20 exonerate him. (*Ibid.*) In another, jurors given damaging testimony and jury
21 instructions about the unreliability of DNA evidence in the case, still convicted at a rate
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1 of 62 percent. (*Ibid.*) As one expert has found, jurors and judges can be misled and
2 confused when the results of a GSR test don't mention the possibility of contaminations.
3 (Dennis L. McGuire, M.S., *The Controversy Concerning Gunshot Residue Examinations*,
4 *Forensic Magazine*, Aug. 1, 2008, [http://www.forensicmag.com/article/controversy-
6 concerning-gunshot-residues-examinations?page=0,2](http://www.forensicmag.com/article/controversy-
5 concerning-gunshot-residues-examinations?page=0,2).) In *People v. Venegas*, the
7 California Supreme Court acknowledged that complex scientific evidence can have a
8 powerful impact on juries, and may prejudice jury decisions. ((1998) 18 Cal. 4th 47, 79;
9 *See also People v. Axell* (1991) 235 Cal.App.3d 836, 862 (explaining that courts must
10 critically examine the reliability of scientific evidence before it is presented to a jury
11 because of its potential to affect decision-making).)

12
13 California courts have found that judges have discretion to exclude scientific
14 evidence if the proponent does not make a threshold showing of reliability. In *People v.*
15 *Maury*, the California Supreme Court held that polygraph evidence was inadmissible
16 under California Evidence Code 352 because the proponent failed to prove that the
17 results of the test were accurate. ((2003) 30 Cal.4th 342, 433.) The Court reasoned that
18 because the individual test employed by the proponent was unreliable, it was not
19 highly relevant to the case at hand. (*Ibid.*)

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21 Here, both examiners and scientists agree that it is impossible to precisely
22 interpret the results of a GSR test. Further, the Los Angeles County Coroner's Office
23 departed from the standard procedure accepted by the industry. Accordingly, like in
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1 *Maury*, the evidence is unreliable and should be inadmissible under California Evidence
2 Code Section 352.

3 In *People v. Sloane*, a California circuit court held that expert testimony in regards
4 to blood evidence was inadmissible because the expert could not determine whether it
5 was human blood. ((1978) 76 Cal.App.3d 611, 631.) The Court reasoned that because
6 the expert could not make an identification, it was irrelevant. (*Ibid.*) However, the
7 Court found that, despite this, it was prejudicial to the defendant. (*Ibid.*)

8
9 The lab technician in this case, if called to testify, would not be able to identify
10 whether the particle collected from Mr. Miranda was actually GSR or whether, even if
11 GSR, he collected it while discharging a firearm. However, jurors exposed to Mr.
12 Miranda's GSR test could easily misconstrue the laboratories determination that Mr.
13 Miranda *could have* discharged a firearm to mean that *he did*. Further, the fact that the
14 SEM/EDS test does not consider mitigating circumstances such as Mr. Miranda's
15 proximity to other individuals who could have fired the gun or the potential for
16 contamination at the residence where investigators collected the GSR could further
17 prejudice him. Accordingly, both the testimony and results of the test are inadmissible
18 under California Evidence Code 352.
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21 III. CONCLUSION

22 Courts have become gatekeepers for scientific evidence to insure that only
23 scientifically validated techniques are admitted to determine guilt or innocence. New
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evidence has revealed that GSR analysis is not validated. Further, aside from the systemic problem with GSR testing, the GSR evidence collected from Mr. Miranda is both flawed and prejudicial. Accordingly, it is not probative of guilt or innocence, and should be held inadmissible under the *Kelly/Frye* test and Evidence Code section 352.

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Respectfully submitted,

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