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SUPERIOR COURT OF CALIFORNIA

COUNTY OF MONTEREY

THE PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff, vs. PAUL RUBEN FLORES & RUBEN RICARDO FLORES, Defendants	CASE NOS. 22CR003712 & 22CR003713 OPPOSITION TO MOTION TO EXCLUDE EVIDENCE RELATED TO 710 WHITE COURT INSPECTION, INVESTIGATION, AND SOIL ANALYSIS Date: July 7, 2022 Time: 8:30 AM Dept. 4

I

INTRODUCTION

An archeological team analyzed a specified grid of land underneath the porch at 710 White Court and identified specific possible anomalies with the use of ground-penetrating radar, one of which was of a size consistent with a human burial site. They then excavated the areas of the anomalies to verify their existence and determine their nature. In the area of the largest anomaly, the excavation located an area of staining consistent in size and manner with the decomposition of human remains but with soil disturbance consistent with the removal of a body. Soil samples taken from the stained soil tested positive for hemoglobin in human blood. The floor of a trailer seen in the area of the burial site tested positive in a presumptive luminol-based test for blood.

This evidence is competent, relevant proof that the body of Kristin Smart was previously buried underneath the porch of defendant Ruben Flores and subsequently removed, and was derived by methods that are generally accepted by the scientific community. The People have previously and will again establish the relevance and admissibility of testimony regarding the ground-penetrating radar evidence, the excavation of the largest anomaly that revealed staining consistent with a human burial, the testing of the soil samples that revealed the presence of human blood, and the presumptive luminol-based testing of the trailer observed parked in the area of the burial site that was positive for the presence of blood.[1]

II

STATEMENT OF PERTINENT AND ANTICIPATED FACTS[2]

A. Inspection of Land Grid Underneath the Porch at 710 White Court

Cindy Arrington and Phil Hanes are part of a small company called Natural Investigations Company, Inc., headquartered in Sacramento. Natural Investigations performs a variety of archeology work, and in their work together Ms. Arrington and Mr. Hanes have completed 50 to 100 large-scale excavation and small-scale testing projects. (PH RT 5110, 5226.) In their work on excavation sites, Mr. Hanes operates a ground-penetrating radar machine to look for evidence of a disturbance underneath the ground level, and if the machine detects an anomaly, Ms. Arrington carefully excavates the area of the anomaly to determine if something is there. (PH RT 5188.)

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[1] The defense notes an unrelated complaint regarding the refusal of the prosecution to provide the soil samples in evidence to Technical Associates, Inc., laboratory for testing. While this claim is irrelevant to the motion at hand, the People wish to note in response that they previously made the soil samples available to Wallace Labs in El Segundo at the request of the defense. Technical Associates, Inc., is also not accredited to perform analysis on either DNA or blood evidence.

[2] Statement of pertinent and anticipated facts taken from the preliminary hearing reporter's transcript ("PH RT"), notes by Phil Hanes attached as Exhibit A, notes by Cindy Arrington attached as Exhibit B, Sheriff's Office case number 960610965 supplemental report number 782 attached as Exhibit C, SERI laboratory report number 11034.19 attached as Exhibit D, Sheriff's Office case number 960610965 supplemental report number 823 attached as Exhibit E, SERI HemDirect validation documents attached as Exhibit F, and Sheriff's Office case number 960610965 supplemental report number 565 attached as Exhibit G. All of the attachments are hereby incorporated by reference. The September 8, 2021, preliminary hearing transcript will be referred to as "9/8/21 RT" because it has separate pagination from the rest of the preliminary hearing transcript referenced in this motion.

Mr. Hanes has been an archeologist for fifteen years. (PH RT 5108.) He has a bachelor's degree in anthropology and a master's degree in a subset of archeology called cultural resource management, and his master's degree thesis heavily focused on the use of ground-penetrating radar in archeology. (PH RT 5108, 5131.) He is a registered professional archeologist, membership in an organization that maintains ethical and educational standards for archeologists. (PH RT 5133.) He is a member of the Society for California Archeology, the Society for Historical Archeology, and the Society for American Archeology, and he attends professional conferences and lectures to stay up to date on new developments in his field. (PH RT 5109-5110.) Mr. Hanes specializes in remote sensing, which uses technology to gain a better understanding of what is underground prior to possible excavation. (PH RT 5110-5111.)

One particular technique that Mr. Hanes has specialized in is ground-penetrating radar, which is the transmission of electromagnetic waves into the ground to measure their reflections to determine what may or may not be underground. (PH RT 5111-5112.) Radar technology that forms the base of the machine is a hundred years old, and was developed initially by the military for aerial radar. (PH RT 5141.) It was used for ground-penetrating radar in the 1960s and 1970s for scientific geological research and became more commercially available in the 1970s and 1980s. (PH RT 5141.) Ground-penetrating radar was applied until around the early 1990s with the advent of modern computer processing which provided for better modeling with the data. (PH RT 5141-5142.) Depending on the frequency of the antenna, it can be used for concrete detection, structural determination of bridges, geologic or oil and gas exploration, and more. (PH RT 5142.)

Mr. Hanes uses a machine with an antenna and physical radar connected to a field computer to collect data. (PH RT 5112.) In this process, he is looking for anomalies, or consistency changes to the underground environment that is visible on the radar, which include voids and pipes but are more often soil changes caused by digging/excavation and backfill. (PH RT 5112; Exh. A.) To accomplish this, Mr. Hanes creates a tight grid (typically one-foot transects) on the ground surface then uses the ground-penetrating radar unit to send radar pulses within the ground and receive a signal back to determine buried anomalies. (PH

RT 5111, 5113.) He then reviews the data reflecting horizontal slices across the ground to determine whether there are anomalies in any locations within the grid. (PH RT 5115.)

Ground-penetrating radar has been subject to extensive peer review, and the topic of ground-penetrating radar and human remains is the subject of scholarly articles and books. (Exh. A.) Some of the academic literature included scientific experiments to determine the accuracy and feasibility of ground-penetrating radar on detecting burials. (Exh. A.) The methods used by Mr. Hanes are standard and representative of good data-collecting practice, as described in "Ground Penetrating Radar of Archaeology" by Lawrence Conyers. (Exh. A.)

Mr. Hanes has used ground-penetrating radar machines since his time as an undergraduate, has received trained in it both by his college advisor—one of the preeminent practitioners in the field who assisted in the development of the hardware and its application to archeology—and by the manufacturer, and has taken subsequent classes on the topic. (PH RT 5114, 5128.) He has owned the machine he uses for approximately eleven years, and has used ground-penetrating radar on a site approximately 30 times. (PH RT 5115, 5135.)

On March 15, 2021, Ms. Arrington and Mr. Hanes began work on an evaluation and possible excavation of 710 White Court in Arroyo Grande. (PH RT 5186.) Ms. Arrington and Mr. Hanes examined the requested areas, took soil samples to calibrate the radar unit to determine depth, cleared brush and objects from under the porch to provide access for the machine, calibrated the machine for the specific environment of sand, and set up a specific grid pattern for the analysis. (PH RT 5119-5120, 5186-5187.) Ground-penetrating radar can penetrate most materials except metal, and disturbance from grasses and household weeds do not significantly impact ground-penetrating radar data. (PH RT 5123, Exh. A.)

Ms. Arrington and Mr. Hanes ran approximately six grids at 710 White Court that day and identified four anomalies of interest under the porch, identified in the grid pattern as Grid 1, Grid 3 and Grid 10. (PH RT 5148, 5189.) The largest anomaly was approximately four feet by six feet in Grid 1, a size that was large enough to fit human remains, and began at the surface or close to it and went approximately three and a half or four feet deep. (PH RT 5149, 5153,

5189.) Grid 1 was relatively flat and easy to work with, without much surface obstruction. (PH RT 5126.)

B. Excavation of Grid 1 Underneath the Porch at 710 White Court

Ms. Arrington is an archeologist. (PH RT 5182.) She has a bachelor's degree in anthropology and a master's degree in historical archeology with an emphasis on human remains. (PH RT 5182.) She has worked in the field of archeology since the 1980s, and approximately 25 percent of that work has dealt with human remains. (PH RT 5183-5184.) She has evaluated hundreds of sites with possible human remains. (PH RT 5184.) Ms. Arrington has been a Registered Professional Archeologist since 2004. (PH RT 5184-5185.)

As a body decomposes it begins to liquify, and this liquification creates a very distinct stain in soil in which a body has been buried. (PH RT 5195.) When a burial has never been disturbed, archeologists typically find a large ring around it where the body has decomposed and liquefaction has slowly spready out, and this staining can remain there. (PH RT 5195, 5202.) Ms. Arrington has personally observed similar staining in an excavation of prehistoric remains that were 3,500 years old. (PH RT 5202.) This staining did not match the stratigraphy in the soil surrounding the anomaly. (PH RT 5200.)

Prior to excavating Grid 1, Ms. Arrington and Mr. Hanes took specific steps to ensure the integrity of the excavation, including ensuring the ground surface was clear and setting up tarps and buckets to isolate and hold any soil removed from the anomaly. (PH RT 5191:26-5192:8.) With the assistance of Sheriff's Office personnel, Ms. Arrington excavated the large Grid 1 anomaly and located what she referred to as a thin "bathtub ring" where the stain ran along the sides of the hole in the location of the identified anomaly. (PH RT 5193.) This staining is consistent with fluid having permeated that strata or layer of soil. (PH RT 5194.)

Based on Ms. Arrington's experience excavating human remains, the stain was consistent with that of a decomposition stain also referred to as a cadaver-soaked stain. (PH RT 5195.) The soil appeared to have been disturbed between the staining and the March 2021 excavation because it had no defined stratigraphy and the staining lacked a definitive, continuous bottom or "basement layer" where the fluid congregated that is typically seen when

a burial has not been disturbed. (PH RT 5202-5204, 5269-5270.)[3] Ms. Arrington did not locate any possible source for the leaked fluid, which suggested, in conjunction with the evidence of disturbance post-staining, that the hole had been previously excavated and the source of the leaked fluid had been removed. (PH RT 5202-5204.) Ms. Arrington did not locate any bones in the area of the staining, which—given the staining that was consistent with a decomposition stain from a human burial—would be consistent with a body having been wrapped in a semi permeable material that allowed some fluids to leak out but kept the bones contained. (Exh. B, C.)

The staining was inconsistent with staining from a plumbing issue, as Ms. Arrington would expect to see a feathering stain and not a bathtub ring. (PH RT 5204.)

Excavation of the areas of the anomalies in Grid 3 and Grid 10 did not locate anything of significance. (PH RT 5166-5167.) Ms. Arrington assisted Sheriff's Office personnel in the collection of soil samples from the excavation. (PH RT 5261.)

C. **Testing of Soil Samples Taken from Staining in Soil at 710 White Court**

Angela Butler is a forensic serologist at SERI and specializes in the identification of body fluids and the performance of DNA analysis. (9/8/21 RT 4.) She earned a bachelor's degree of science in biology from the University of San Francisco in 1998, spent several years after graduating in the biotechnology industry working with DNA in a research setting that involved sequencing the human genome in search of drug targets to help with diabetes, and has been a forensic serologist at SERI since 2001. (9/8/21 RT 4-6.) She began as an assistant forensic serologist and is currently the senior analyst and the lab supervisor. (9/8/21 RT 6.)

Along with her college degree, Ms. Butler has taken all of the upper-level coursework required by the FBI to be a forensic DNA analyst. (9/8/21 RT 5-6.) She received extensive on-

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[3] Shelby Liddell testified that the staining that *was* located did not appear to have been disturbed. (PH RT 5758.) Contrary to the defense claims but consistent with the magistrate's holding order at the preliminary hearing, this is not inconsistent with Ms. Arrington's testimony, which noted that portions of the staining that would have comprised the bottom layer appeared to be missing. The magistrate specifically noted that "[b]oth Ms. Arrington and Shelby Liddell testified that the staining had been disturbed in areas and was discontinuous. And when questioned closely about the photographs of the soil staining by Mr. Sanger, Liddell was careful to say that the staining in the photographs had not been disturbed." (PH RT 6308.)

the-job training at SERI over the last 20 years, goes to continuing education as required for accreditation standards, and stays current up to date on the forensic literature in her field. (9/8/21 RT 5.) As part of her duties, Ms. Butler works with human blood and tests for the presence of DNA as well as the presence of human blood. (9/8/21 RT 10.)

The process of testing for the presence of human blood at SERI involves two steps. The first step is an orthotolidine presumptive test, used by SERI since it was founded in 1978, where an analyst touches a small piece of filter paper to the suspected blood stain or stain of interest, adds a drop of one chemical then a second drop, and inspects the filter for a color metric change. (9/8/21 RT 10-11.) If there is a reaction, the filter paper turns blue. (9/8/21 RT 11.) Iron can cause a very slow and very weak false positive result. (9/8/21 RT 11.) Ms. Butler was trained in the orthotolidine test, has performed the test tens of thousands of times, has trained others in the orthotolidine test, and does technical reviews of the orthotolidine test. (9/8/21 RT 11-12, 17.) The small portion of a sample that is used in the orthotolidine test is not placed back in the original sample. (9/8/21 RT 53.)

The second step is a SERATEC HemDirect confirmatory test that is a very sensitive test that detects the presence of hemoglobin, which is the red pigment found in red blood cells, on a variety of forensic samples. (9/8/21 RT 13, 44.) The test kit is a plastic cartridge with a membrane, and the analyst adds a sample to the well on the membrane for an antigen-antibody interaction. (9/8/21 RT 13.) During a test, the test membrane should show a pink band in the control section to confirm the test is working properly and a second pink band after ten minutes if there is a positive result. (9/8/21 RT 13.) The test is human-specific, though it can show positive tests for the blood of higher primates like chimpanzees and gorillas. (9/8/21 RT 13-14.) The literature and SERI's own validation study tested cross-reactivity with a number of animals, including dogs, cats, sheep, pigs, cows, and ferrets, and all were negative except the ferret, which showed a slight positive reaction. (9/8/21 RT 14.) SERI's validation study also determined that the test can detect weak positive results for hemoglobin in other bodily fluids like saliva, semen, and urine, all of which have trace numbers of red blood cells. (9/8/21 RT 80.) The SERATEC HemDirect test is generally accepted in the courts and

scientific community and has been validated by numerous labs across the country. (9/8/21 RT 63.) Ms. Butler is not aware of any false positive results from the test in the literature and is not personally aware of any false positives in her experience. (9/8/21 RT 93.)

SERI has been using the HemDirect test for almost ten years, and Ms. Butler has been trained on its use. (9/8/21 RT 16.) Ms. Butler had to pass an internal competency examination using the test on a number of stains in order to administer the test, and every six months she is required to perform proficiency examinations for every test she has been trained to do, including the SERATEC HemDirect test. (9/8/21 RT 16.) Ms. Butler's lab has used the SERATEC HemDirect test at least one thousand times in casework, she has trained other analysts how to use it, and she does technical reviews for the tests. (9/8/21 RT 16.) Ms. Butler has utilized the HemDirect test with soil three times prior to this case, and other analysts in her lab have used the HemDirect test on soil as well. (9/8/21 RT 49, 74.) Validation studies on the HemDirect test exist for a variety of substances. (9/8/21 RT 44; Exh. E.) Between 75 and 100 laboratories in the United States utilize the HemDirect test, and multiple labs have used the HemDirect test can detective hemoglobin on samples over 30 years old, and these results are consistent with the literature. (Exh. E.)

Testing for the presence of DNA occurs after testing for the presence of human blood, in part because testing for the presence of DNA involves the extraction of any potential DNA by mechanically opening the cells to release the DNA by chemical means, the purification of the sample to remove all extra cellular material, the measurement of the amount of DNA recovered, and the subsequent DNA analysis. (9/8/21 RT 17-18.) Ms. Butler has tested for the presence of human DNA tens of thousands of times. (9/8/21 RT 18.)

On March 17, 2021, the Sheriff's Office delivered two containers of soil samples (Evidence Items 775 and 776) to the Serological Research Institute (SERI) in Richmond, California, for analysis. (9/8/21 RT 21.) Ms. Butler weighed and photographed the soil samples and placed them in sterile plastic containers. (9/8/21 RT 23.) She administered orthotolidine presumptive tests on one sample of material from Evidence Item 775 and six samples of material from Evidence Item 776 and all seven reflected weak positive results for blood.

(9/8/21 RT 24-26.) Ms. Butler then visually inspected the samples and collected samples using a stereomicroscope. (9/8/21 RT 47.) She administered the HemDirect confirmatory test to each sample by dissolving it into a special buffer solution to neutralize the PH to avoid the possibility of a false negative test and placing the resulting liquid onto the HemDirect test card. (9/8/21 RT 24-26, 45.) The confirmatory test was negative for Evidence Item 775, negative for one sample from Evidence Item 776, weak positive for two samples from Evidence Item 776, and positive for three samples from Evidence Item 776. (9/8/21 RT 26-27.)

On April 27, 2021, the Sheriff's Office delivered Evidence Items 898, 831, 847, 849, 863, and 859 to SERI for analysis. (9/8/21 RT 28.) Ms. Butler administered presumptive and confirmatory tests to samples from all six evidence items with the following results:

Item No.	Location	Presumptive Test	Confirmatory Test
859	Soil Probe, Area E (4 samples)	Positive Positive Positive Positive	Weak Positive Weak Positive Negative Negative
831	Control Sample, Northwest Corner (2 samples)	Negative Negative	Negative Negative
847	Stained Soil, Area A2 (3 samples)	Weak Positive Weak Positive Weak Positive	Weak Positive Weak Positive Positive
849	Soil Stain, Area B4 (2 samples)	Weak Positive Weak Positive	Negative Weak Positive
863	Soil Sample, Area A2	Weak Positive Weak Positive Weak Positive	Positive Positive Not tested

(9/8/21 RT 28-34.) The control pink band in the test, the testing of control soil samples that yielded negative results, and the fact that not all separate samples from individual items of evidence tested positive are consistent with the test working properly. (Exh. E.)

Ms. Butler also attempted to extract DNA from all of the samples tested for the presence of hemoglobin but did not detect any DNA in the samples. (9/8/21 RT 33-34.) Receiving a positive test for the presence of hemoglobin and no detection of DNA is not inconsistent because red blood cells break down differently than DNA double helixes. (9/8/21 RT 83.) Soil is not a solid material from which DNA can be directly extracted, while the test for the presence

of human blood can detect one part in ten million, and the hemoglobin test detects for the presence of red blood cells, which do not contain DNA. (9/8/21 RT 34-35.) DNA is degraded over time by heat, moisture, and microbes that exist in soil, and the soil samples in question were damp. (9/8/21 RT 20, 34-35, 73.) Liquid blood may have DNA and red blood cells in it, but blood poured into the dirt would be broken down over time by enzymes, the blood would start to decay, and the protein would start to denature. (9/8/21 RT 79-80.) Microorganisms that live in soil are attracted to biological material and would begin to break it down. (9/8/21 RT 80.) When protein is denatured, it ruptures the cell membrane and the nucleus where DNA resides, which releases the DNA into the soil where it is broken up into fragments. (9/8/21 RT 81-82.) Humic acid, found in soil, also chews up DNA fragments and affects the quantity and quality of DNA recovery. (9/8/21 RT 84.) At that point, the DNA may not be usable but other things, like red blood cells, may still be detectable. (9/8/21 RT 83.) Studies regarding the aging of blood on the surface of objects and likelihood that hemoglobin will no longer exist over time are not the same as soil samples covered by three to four feet of soil. (Exh. E.)

D. Testing of Trailer Seen at 710 White Court

Bluestar is a luminol-based technique used to enhance potential blood evidence using a chemical that reacts to hemoglobin in blood, creating a chemical luminescence that glows blue and is visible in the dark. (PH RT 4954-4955; Bluestar Forensic, "The Chemistry of Bluestar Forensic," < https://www.bluestar-forensic.com/the-chemistry-of-bluestar-forensic/> [as of June 22, 2022].) It is a presumptive reagent for the presence of blood. (Exh. G.) Household cleaners that contain chlorine with bleach, some vegetables and foods, paints and varnishes have shown false positives. (PH RT 4955, 4960.) Blood tends to glow very slowly and shows bright blue, whereas false positives typically flash and sometimes glow white instead of blue. (PH RT 4955.)

Shelby Liddell, a Forensic Specialist for the San Luis Obispo County Sheriff's Department, received training on the Bluestar technique on the job, in a Field Evidence Technician course, and Advanced Crime Scene investigation course on luminol techniques and Bluestar application. (PH RT 4954.)

On April 21, 2021, Ms. Liddell was present at 710 White Court when a white Haulmark Passport Cargo trailer was located and towed to the Crime Lab. (PH RT 4958, 4956).) She was present for the initial search of the trailer, which was pretty full of items including tools, files, and paperwork, and photographed items of note identified by detectives. (PH RT 4955-4956.) After the initial search of the trailer, Ms. Liddell photographed the area she would be applying Bluestar to with a flash and normal light and applied Bluestar in spray bottle form. (PH RT 4959-4960.) She captured the slow luminescence of the Bluestar reaction and glow with a camera in manual setting with an open shutter over the course of 30 seconds. (PH RT 4950-4960.) The Bluestar application had a reaction on the floor inside the side door entrance to the trailer. (Exh. G.) The composite photograph of the Bluestar reaction was approximately a foot and a half to two feet in width and two and a half to three feet in length. (PH RT 4962.) The area where the reaction was observed was cut out of the floor and booked into evidence. (Exh. G.)

Ms. Butler also performed a presumptive orthotolidine test on Evidence Item 898, plywood from the trailer, and received a very weak positive result. (9/8/21 RT 36.) She did not perform a confirmatory test on it due to the nature of the presumptive result, the lack of visible stains, and the desire to use the entire sample for possible DNA extraction. (9/8/21 RT 36.) Ms. Butler did not locate any DNA from Kristin Smart, Paul Flores, or Ruben Flores on the plywood from the trailer. (9/8/21 RT 36-37.)

III

LAW AND ARGUMENT

The People must prove its case to a jury beyond a reasonable doubt, but that standard does not apply to the admissibility of evidence. (Pen. Code, § 115.) Subject to foundational requirements, evidence is relevant when it has "*any tendency in reason* to prove or disprove any disputed fact that is of consequence to the determination of the action." (Evid. Code, § 210, emphasis added.) The party offering expert testimony has the burden of proving its admissibility by a preponderance of the evidence. (*People v. Nieves* (2021) 11 Cal.5th 404, 444 (*Nieves*).)

Expert opinion testimony is relevant when it is related to a subject that is sufficiently beyond common experience that the opinion of an expert would assist the trier of fact, and it is based on matter, including special knowledge, skills, experience, training, and/or education, that is reasonably relied upon by an expert in forming an opinion on the subject. (Evid. Code, § 801.) The challenged ground-penetrating radar evidence of an anomaly of a size consistent with a human burial, the soil stratification and staining evidence consistent with a previous human burial that has since been disturbed, the hemoglobin test evidence of the stained soil samples that was positive for human blood, and the luminol-based presumptive test of the trailer observed at the burial site that was positive for blood are relevant evidence that Kristin Smart's body was previously buried under 710 White Court, are not based on new or novel scientific techniques, are not clearly invalid and unreliable, and are therefore admissible.

A. THE ADMISSIBILITY OF EXPERT TESTIMONY

The court serves two separate but related gatekeeping functions for scientific evidence and expert testimony: the *Kelly* rule of admissibility of expert testimony based on a new or novel scientific technique, and the *Sargon* test that requires expert testimony have a sufficient basis to merit a jury's consideration. (*People v. Lund* (2021) 64 Cal.App.5th 1119, 1136-1138.)

1. The *Kelly* Rule on the Admissibility of New Scientific Techniques

The admissibility of expert testimony based on a new or novel scientific technique is governed by rules adopted in the leading cases of *Frye v. United States* (D.C. Cir. 1923) 293 Fed. 1013 (*Frye*) and *People v. Kelly* (1976) 17 Cal.3d 24 (*Kelly*) (abrogated by statute on another point as explained in *People v. Wilkinson* (2004) 33 Cal.4th 821, 845-848). Federal courts have since abandoned *Frye* (*Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579; *People v. Cowan* (2010) 50 Cal.4th 401, 469, fn. 22); however, California has retained the *Kelly* test. (*People v. Leahy* (1994) 8 Cal.4th 587, 598-604, 612; see also *Sargon Enterprises, Inc. v. University of Southern California* (2012) 55 Cal.4th 747, 772, fn. 9 (*Sargon*).)

Under the *Kelly* test, the proponent of evidence derived from a "new scientific technique" must show " '(1) "the technique is generally accepted as reliable in the relevant

scientific community"; (2) "the witness testifying about the technique and its application is a properly qualified expert on the subject"; and (3) "the person performing in the test in the particular case used correct scientific procedures." [Citation.]' " (*People v. Nieves* (2021) 11 Cal.5th 404, 444 (*Nieves*).) "The first and third prongs can be confused; the *Kelly* first-prong analysis applies only to a new technique or procedure, whereas the third prong is case specific." (*People v. Stevey* (2012) 209 Cal.App.4th 1400, 1410.) "In determining whether there has been 'general acceptance,' '[t]he goal is not to decide the actual reliability of the new technique, but simply to determine whether the technique is generally accepted in the relevant scientific community.' [Citation.]" (*People v. Morganti* (1996) 43 Cal.App.4th 643, 656.) The party offering the evidence has the burden of proving its admissibility by a preponderance of the evidence. (*Nieves*, *supra*, 11 Cal.5th at p. 444.)

Not all new scientific testing procedures or instruments are subject to the *Kelly* test. "The *Kelly* rule is frequently inapplicable to expert testimony because the testimony is often neither based on a new scientific technique nor likely to convey an aura of certainty. '[A]bsent some special feature which effectively blindsides the jury, expert opinion testimony is not subject to *Kelly*.' [Citation.]" (*In re O.D.* (2013) 221 Cal.App.4th 1001, 1006-1007.)

2. The *Sargon* Rule for Expert Testimony

Evidence Code section 801 mandates that expert witness testimony be based on matter, including the witness's special knowledge, skill, experience, training, and education, "that is of a type that reasonably may be relied upon by an expert in forming an opinion on the subject." (*Id.*, subd. (b).) Under section 801 and 802, "the trial court acts as a gatekeeper to exclude expert opinion testimony that is (1) based on matter of a type on which an expert may not reasonably rely, (2) based on reasons unsupported by the material on which the expert relies, or (3) speculative." (*Sargon*, *supra*, 55 Cal.4th at pp. 771-772.)

The California Supreme Court warned trial courts to be cautious in excluding expert testimony, as the goal of trial court gatekeeping is "simply to exclude 'clearly invalid and unreliable' expert opinion." (*Id.* at p. 772.)

> The court must not weigh an opinion's probative value or substitute its own opinion for the expert's opinion. Rather, the court must simply determine whether the matter relied on can provide a reasonable basis for the opinion or whether the opinion is based on a leap of logic or conjecture. The court does not resolve scientific controversies. Rather, it conducts a 'circumscribed inquiry' to 'determine whether, as a matter of logic, the studies and other information cited by experts adequately support the conclusion that the expert's general theory or technique is valid.' [Citation.]

(*Id.*) "In short, the gatekeeper's role 'is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.' " (*Id.*)

"The trial court has broad discretion in deciding whether to admit or exclude expert testimony [citation], and its decision as to whether expert testimony meets the standard for admissibility is subject to review for abuse of discretion." (*People v. McDowell* (2012) 54 Cal.4th 395, 426.) Unless the expert testimony is inadmissible under the *Kelly* or *Sargon* tests, arguments regarding its persuasiveness go to the weight and not the admissibility of the evidence. The defense is entitled to present their own expert as a defense witness on the issues and to challenge the persuasive value of the expert's opinion through cross-examination, but "questions regarding the validity or the credibility of an expert's knowledge are matters for the jury to decide" and do not provide a basis for excluding the expert's testimony. (*People v. Morales* (2020) 10 Cal.5th 76, 101.)

A. <u>Phil Hanes' Testimony About Ground-Penetrating Radar</u>

Phil Hanes provided a sufficient foundation for his use of ground-penetrating radar technology in his role in the search of 710 White Court. His education and career have focused on the use of ground-penetrating radar, he trained under one of the preeminent practitioners in the field who assisted in the application of the technology to archeology, and the use of ground-penetrating radar—which has been subject to extensive peer review—in the detection of human remains has been the subject of scholarly articles and books. Mr. Hanes has also

received training from the manufacturer of the device, has owned the machine for approximately eleven years, and has used the technology on a site approximately 30 times.

Furthermore, Mr. Hanes deployed the ground-penetrating radar technology in the manner in which he was trained in an environment conducive for the science.

And finally, the use of ground-penetrating radar was an initial approach to the soil and anomalies identified in its use were then subject to "ground-truthing" or verification by excavation. The defense would have the court believe this is a weakness in the evidence, but rather, it is one step in a complete investigation of the soil and its results are also admissible to explain the subsequent excavations. It is not only admissible on its face, but its reliability was subject to validation in this case by excavation.

Based on the foundational evidence provided to the court through preliminary hearing testimony, the attached exhibits, and anticipated testimony at the contested hearing on this motion, the concerns raised by the defense may be the appropriate subject of cross-examination, subject to appropriate objections, but they go only to the weight of the testimony and not its admissibility.

B. <u>A Scientific Basis Exists to Assert the "Bathtub Ring" Soil Staining is Consistent with a Human Burial</u>

The defense would have the court believe that the staining in Grid 1 at 710 White Court, identified by ground-penetrating radar, confirmed by excavation, the size of a human body burial site, consistent with staining patterns observed at human burial sites, and whose soil tested positive for the presence of hemoglobin, is "not probative" to whether the son of its occupant murdered Kristin Smart and its occupant assisted in hiding the murder. This evidence is relevant and highly probative evidence of whether and how the defendants initially disposed of the body of Kristin Smart.

1. Staining Pattern Consistent with Human Burial

Cindy Arrington has worked in the field of archeology since the 1980s and both her education and her professional experience has included a focus on human remains. She has evaluated hundreds of sites with possible human remains, and has personally observed a

large ring of staining in the soil around a burial site that occurs when a body decomposes and liquifies. In this case, Ms. Arrington personally assisted in the excavation of Grid 1, took steps in accordance with her training to ensure its integrity, and observed evidence of the type of "bathtub ring" staining that she has seen at human burial sites over the course of her career. The difference between the human burial sites Ms. Arrington has worked where a body has been discovered and this site is that the staining appeared to have been disturbed since it occurred: the soil in the area did not exhibit the sort of stratification consistent with that around it and the bottom layer was interrupted. Ms. Arrington assisted in obtaining soil samples of the stained areas for testing to determine whether they contained hemoglobin consistent with human blood and, therefore, consistent with a human burial.

Not only are Ms. Arrington's observations based on training and experience that is more than sufficient for their interpretation, but the defense contention that the lack of human remains renders them unreliable is directly contradicted by Ms. Arrington's testimony and observations. The fact that the soil appeared to have been disturbed after the staining occurred combined with the fact that a body wrapped in a semipermeable material would have resulted in bodily fluids and liquified remains leaking out to create the staining but bones remaining contained within the material is consistent with and highly probative of the prosecution theory that the body of Kristin Smart was buried under Grid 1 for some time but was subsequently removed.[4]

Like Mr. Hanes' testimony, the concerns raised by the defense related to the excavation and staining of the soil may be the appropriate subject of cross-examination, subject to appropriate objections, but they go only to the weight of the testimony and not its admissibility.

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[4] The fact that a tenant who moved into the residence in 2010 did not notice an odor coming from the deck almost 15 years after Kristin Smart was murdered does not diminish the relevance of this evidence. Indeed, Ms. Arrington testified that the first four stages of the decomposition of a body occur within the first 24 days and include fresh decomposition, bloat, decay, and active decay. (PH RT 5232.) The final stage, called skeletonization, can occur from 24 days to 10 years, and would have concluded almost five years before the tenant moved in. (PH RT 5232.)

2. Positive Results in Forensic Analysis of Soil are Admissible

Ms. Butler has spent almost twenty years working as a forensic serologist, testing samples for the presence of hemoglobin and DNA and analyzing DNA samples. Both the presumptive orthotolidine test and the confirmatory HemDirect test are tests that Ms. Butler is trained to do, has conducted many times, has trained other analysts to conduct, and are generally accepted in the scientific community.[5] At least 75 laboratories in the United States alone utilize the HemDirect test, which has been the subject of validation tests at SERI and which has been documented detecting hemoglobin in samples at least 30 years old and detecting hemoglobin in bodily fluids other than blood. Ms. Butler conducted the tests in this case in accordance with her training.

While the issues before the court in this motion are primarily case-specific and evidence-based, some of the issues have an historical underpinning documented in case law. More than 30 years ago, the California Supreme Court noted that "presumptive tests for blood are generally accepted by California courts, and have been used by criminologists and admitted into evidence in this state for over 40 years." (*People v. Coleman* (1988) 46 Cal.3d 749, 775.) The documented history of the use of tests of substances for the presence of hemoglobin in blood, combined with the information provided to the court regarding the specific tests used in this case, provides more than a sufficient foundation for the admissibility of its results.

The evidence demonstrates that the testing of substances for hemoglobin is not a "new scientific technique" under *Kelly*, but even assuming arguendo that this court finds the HemDirect hemoglobin test is a new scientific technique, it meets all three prongs of the *Kelly* test. The defense has not challenged the first prong of *Kelly* (Def. Mot. at p. 10), but the widespread use of the test in laboratories throughout the country and Ms. Butler's testimony

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[5] The defense has not explicitly challenged the orthotolidine test in their motion. If they raise that issue after the filing of this response, the People respectfully refer the court to the case law and analysis contained in section III, subdivision (C) of this opposition and request the opportunity to more fully address any claims not made at the time of the filing of this opposition.

demonstrates the test is generally accepted as reliable in the relevant scientific community.[6] Ms. Butler's education, training, and experience in the field in general and with the tests in particular render her a properly qualified expert. And Ms. Butler's testimony establishes she used correct scientific procedures in her testing process.

Similarly, a *Sargon* gatekeeping analysis also demonstrates that the use of HemDirect testing is valid and reliable. The HemDirect test is made to test a variety of substances for the presence of hemoglobin, and includes a buffer—used by Ms. Butler in her tests—that neutralizes the Ph of the substance to avoid false negative results. It has been used in soil tests by labs including but not limited to Ms. Butler's. The results in this case demonstrate that the test was working as expected because the control portion of the test functioned properly and because the control soil samples taken from areas that did not contain the staining tested negative. The soil sample analysis, done with a commonly used test in an approved manner, is not the "clearly invalid and unreliable" nature that requires exclusion under *Sargon*, and any defense concerns do not affect the admissibility of this evidence but only its probative weight.

C. Testimony About Forensic Analysis of Trailer is Admissible

The defense claims that the presumptive results of the Bluestar chemical used on the trailer are irrelevant and inadmissible, but fails to provide legal authority for their specific claim, likely because the claim that luminol-based presumptive tests for blood are inadmissible has been explicitly rejected by the California Supreme Court in *People v. Alexander* (2010) 49 Cal.4th 846 (*Alexander*). (*Id.* at p. 904.)

In *People v. Burgener* (1986) 41 Cal.3d 505, the California Supreme Court specifically considered the question of a presumptive test for the presence of blood that could not determine whether the blood was human or blood at all, because the test could also produce positive results for animal blood, some vegetable enzymes, and fecal material. (*Id.* at pp. 526-

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[6] Courts have generally held that a new product for a test is not a prong one issue in the *Kelly* analysis. (See, e.g., *People v. Hill* (2001) 89 Cal.App.4th 48 [new kit for PCR DNA testing not a prong one issue].) Hemoglobin tests have been utilized by the scientific community in forensics since at least 1958. (See *People v. Schiers* (1958) 160 Cal.App.2d 364, 374-375 [addressing propriety of court questioning of expert witness about test for the presence of hemoglobin on substances].)

527, disapproved of on other grounds by *People v. Reyes* (1998) 19 Cal.4th 743.) Relying on the definition of relevant evidence in Evidence Code section 210, the Court stated,

> [i]t is difficult to view the presence of a substance which might be blood on the seat of a car in which a murder victim was seen shortly before her death as having *no* tendency in reason to prove that the car's owner might have killed her. Similarly, as here, the presence of a substance which might be blood on defendant's shoes certainly has *some* tendency in reason to prove he might have been present at the scene of a bloody shooting the night before his arrest.

(*Id.* at p. 527, emphasis in original.)

The Court echoed this language in *Alexander*:

> The factors raised in defendant's challenge to this evidence—that the presumptive tests could not confirm the substance tested was human blood, that confirmatory tests failed to confirm the presence of blood, and that it is unknown when the jacket might have been exposed to the substance that created the positive results—do not mean the test results have *no* tendency in reason to establish that defendant shot Agent Cross. Those issues affect the probative weight of the evidence, not whether the test results meet the threshold requirement of relevancy.

(*Alexander*, *supra*, 49 Cal.4th at p. 904.)

In this case, the floor inside the side door entrance of the trailer showed a reaction with the Bluestar application. The section of that trailer showed a weak positive result in a presumptive orthotolidine test by Ms. Butler but Ms. Butler did not locate the presence of DNA of either defendant or Kristin Smart. Pursuant to the rulings in *Burgener* and *Alexander*, the Bluestar presumptive test results on the trailer, as well as the orthotolidine presumptive test results, are relevant to whether Kristin Smart's body was moved from a burial site at 710 White Court in the trailer because they tend to show the presence of human blood. They are also relevant because another possible reason for the positive reaction—household cleaners that contain chlorine with bleach—are relevant to both a recent cleaning of the area of the trailer where a body was placed and to explain the lack of DNA of Kristin Smart. The admission of this evidence does not preclude the defense from exploring the limits of its interpretation.

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IV

CONCLUSION

All of the challenged evidence has at least some tendency in reason to establish the defendants buried the body of Kristin Smart at 710 White Court and removed it before the March 2021 excavation. Phil Hanes, Cindy Arrington, Angela Butler, and Shelby Liddell are highly trained and qualified in their respective fields and used methods which the evidence establishes are generally accepted in their scientific communities. Their testimony, alone and together, more than meets the requirements of relevance and scientific rigor for admissibility.

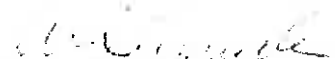
Furthermore, each piece of evidence is relevant not only in and of itself but also to explain the subsequent steps taken in the investigation of the soil at 710 White Court to attempt to determine what that evidence means: Phil Hanes observed suspicious anomalies with his ground-penetrating radar, which led to Cindy Arrington excavating the largest anomaly and observing a staining pattern consistent with a human burial, which led to Ms. Arrington and Ms. Liddell taking samples of the stained soil, which led to Ms. Butler testing the soil and determining that some samples of the stained soil were positive for hemoglobin, and Ms. Liddell tested the trailer seen parked near the suspected burial site and received a presumptive positive test for blood.

Any defense concerns with the evidence can be addressed—if appropriate—on cross-examination or through defense witnesses: "[t]he court may find an expert qualified to give an opinion, and that the opinion is founded on sound logic and reliable theory or technique. Yet an opponent may argue that the jury should not accept it." (*People v. Cottone* (2013) 57 Cal.4th 269, 290; see also Evid. Code, §§ 720 et seq, 801, 802.)

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Respectfully submitted,

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