

State of Maryland v. Oliver Miller, No. 24, September Term, 2020. Opinion by Biran, J.

CONSTITUTIONAL LAW – ARTICLE 21 OF THE MARYLAND DECLARATION OF RIGHTS – SIXTH AMENDMENT OF THE UNITED STATES CONSTITUTION – RIGHT OF ACCUSED TO CONFRONT WITNESSES – The Court of Appeals held that a trial court does not violate a criminal defendant’s rights to confrontation and cross-examination, where the court allows the technical reviewer of a report analyzing DNA evidence to testify about the results of that analysis, without requiring the primary author of the report to be available for cross-examination. Given the thorough, substantive review that a technical reviewer undertakes prior to signing off on the report, the technical reviewer becomes the functional equivalent of a second author of the report. Thus, when the technical reviewer expert witness conveys information in the report to the jury, the witness does not impart testimonial hearsay, but rather provides their independent opinions based on their independent review of the entire testing process and the resulting data. In this case, the testifying witness in Respondent’s trial was the analyst who served as the technical reviewer of the relevant report and adopted its conclusions as her own independent opinions prior to the report’s issuance. As such, the technical reviewer did not convey testimonial hearsay to the jury. Therefore, there was no violation of Respondent’s rights to confrontation and cross-examination under Article 21 of the Maryland Declaration of Rights or his rights under the Confrontation Clause of the Sixth Amendment to the United States Constitution by virtue of the technical reviewer testifying instead of the primary author of the report.

CONSTITUTIONAL LAW – ARTICLE 21 OF THE MARYLAND DECLARATION OF RIGHTS – SIXTH AMENDMENT OF THE UNITED STATES CONSTITUTION – RIGHT OF ACCUSED TO CONFRONT WITNESSES – HARMLESS ERROR – The Court of Appeals held that any error in the expert witness’s reference to the non-testifying primary author of the report in her testimony was harmless beyond a reasonable doubt. Respondent did not cross-examine the testifying witness concerning the accuracy of the DNA match or the statistics, which were also contained in the non-testifying analyst’s report. Under these circumstances, there is no reasonable possibility that the two brief and isolated references to the primary author’s conclusions may have contributed to the rendition of the guilty verdict.

Circuit Court for Baltimore City
Case No.: 117138025
Argued: December 3, 2020

IN THE COURT OF APPEALS
OF MARYLAND

No. 24

September Term, 2020

STATE OF MARYLAND

v.

OLIVER MILLER

Barbera, C.J.
McDonald
Watts
Hotten
Getty
Booth
Biran,

JJ.

Opinion by Biran, J.

Filed: August 5, 2021

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Since the early 1990s, law enforcement officers throughout the United States have solved criminal cases with the aid of the Federal Bureau of Investigation’s Combined DNA Index System (“CODIS”) and the associated National DNA Index System (“NDIS”). These tools permit law enforcement agencies to exchange and compare deoxyribonucleic acid (DNA) profiles in connection with crimes where no suspect has been identified. The indexes link DNA evidence obtained from crime scenes with the known DNA profiles of individuals contained in the indexes. To date, CODIS and NDIS have generated more than 500,000 leads for participating law enforcement agencies. This is one of those cases.

In 2008, an unidentified assailant sexually assaulted L.J.,¹ a 19-year-old woman, in her Baltimore City apartment. Forensic evidence was collected at the woman’s apartment and from her body during a Sexual Assault Forensic Examination (“SAFE Exam”). Forensic scientists generated a DNA profile from the evidence for an “unknown male #1,” the presumptive assailant, but the case went cold. Nine years later, CODIS produced Respondent Oliver Miller as a match for “unknown male #1.” A grand jury subsequently charged Miller with several offenses relating to the sexual assault of L.J.

At Miller’s trial, the State produced several witnesses who were involved in the collection and analysis of the forensic evidence, but the State did not call Thomas Hebert

¹ In a prior case involving the rape of an adult victim, we declined to “use the victim’s name or initials” in order to “protect her privacy.” *Raynor v. State*, 440 Md. 71, 75 n.1 (2014). We use the victim’s initials here because we have decided to include as an appendix to this opinion the crime lab report that is at the center of the constitutional dispute we consider in this case. As redacted in the record before us, that report refers to the victim by her initials.

as a witness. Formerly an analyst in the Baltimore Police Department's Forensic Services Division, Mr. Hebert was the primary author of two reports that analyzed and/or compared DNA evidence relevant to this case: (1) a 2008 report stating that the DNA of "unknown male #1" was identified on the evidence collected from L.J. and her apartment; and (2) a 2017 report naming Miller as the source of that DNA. By the time of Miller's trial, Mr. Hebert had relocated to Georgia. The State proposed to offer the testimony of two other Forensic Services Division analysts in Mr. Hebert's stead: Kelly Miller (no relation to Respondent Oliver Miller), who was the technical reviewer of the 2008 report, and Kimberly Morrow, who was the technical reviewer of the 2017 report. In response, Miller moved on hearsay and confrontation grounds to preclude the State from offering evidence of Mr. Hebert's analyses through these witnesses. The trial court denied the motion and permitted Ms. Miller and Ms. Morrow to testify over Miller's objection. The jury convicted Miller on all counts.

In this appeal, we are concerned with Ms. Morrow's testimony concerning the 2017 report, which named Miller as the suspect in the 2008 sexual assault of L.J. The question before this Court is whether a trial court violates a criminal defendant's constitutional rights, where the court allows the technical reviewer of a report analyzing DNA evidence to testify about the results of that analysis, without requiring the primary author of the report to be available for cross-examination. For the reasons that follow, we answer that question in the negative and affirm Miller's convictions.

I

Background

A. CODIS Program Requirements for Participating Laboratories

In 1990, the FBI piloted the CODIS Program with 14 participating state and local laboratories. *See* Federal Bureau of Investigation, *Combined DNA Index System (CODIS)*, available at <https://perma.cc/RNB8-96SA>. The DNA Identification Act of 1994 authorized the Director of the FBI to establish NDIS and specified the standards for those laboratories that contribute profiles to the indexes. *See* Pub. L. No. 103-322, 108 Stat. 2069 (1994) (codified as amended at 34 U.S.C. § 12592 (2017)).² Today, the indexes contain DNA identification records of persons convicted of and charged with crimes, analyses of DNA samples recovered from crime scenes, analyses of DNA samples recovered from unidentified human remains, and other DNA samples collected under applicable legal authorities. *See* 34 U.S.C. § 12592(a). Each laboratory that contributes to the indexes³ must

² The laws related to CODIS/NDIS have been modified by subsequent legislation since the 1994 enactment. *See* DNA Analysis Backlog Elimination Act of 2000, Pub. L. No. 106-546, 114 Stat. 2726 (2000) (granting authority to federal and state officials to collect DNA samples from persons convicted of federal offenses); Justice for All Act of 2004, Pub. L. No. 108-405, 118 Stat. 2260 (2004) (expanding DNA collection to persons charged in an indictment or information); DNA Fingerprint Act of 2005, Pub. L. No. 109-162, 119 Stat. 2960 (2006) (expanding DNA collection to persons arrested and non-United States persons detained under federal authority). *See also* *Maryland v. King*, 569 U.S. 435, 443-46 (2013) (discussing the CODIS Program).

³ CODIS has three levels of indexes. There is the Local DNA Index System (LDIS), which is used by individual laboratories. The State DNA Index System (SDIS) is used at the state level and serves as a state's database of DNA profiles contributed by LDIS laboratories. NDIS is the national-level index, which contains DNA profiles contributed by participating states. In Maryland, the Department of the State Police is authorized to

comply with the FBI's Quality Assurance Standards for Forensic DNA Testing Laboratories ("QAS" or the "Standards") and undergo periodic audits to ensure their continued compliance. *See id.* § 12592(b).

Relevant to this case, Standard 12.1 requires each participating forensic laboratory to "conduct and document administrative and technical reviews of all case files and reports to ensure conclusions and supporting data are reasonable and within the constraints of scientific knowledge." FBI, *Quality Assurance Standards for Forensic DNA Testing Laboratories*, Std. 12.1 (2011), available at <https://perma.cc/D227-A2GU> ("FBI QAS").⁴ An administrative review is an evaluation of the final report and its supporting documentation "for consistency with laboratory policies and for editorial correctness." *Id.* at Std. 2 (definitions). Under the QAS, an administrative reviewer must:

- review the case file and final report for clerical errors and ensure relevant case information is included in the report and accurate;
- review the chain of custody and disposition of the evidence; and
- follow the laboratory's administrative review documentation procedures.

See id. at Std. 12.3.

collect and store DNA records and samples. *See* Md. Code Ann., Pub. Safety § 2-501 *et seq.* (2018 Repl. Vol. & 2020 Supp.).

⁴ The QAS were updated in 2020. All references to the QAS in this opinion are consistent with the Standards that were in effect at the time Ms. Morrow performed her technical review of the 2017 report.

A technical review, in contrast to an administrative review, is a thorough, substantive review of the primary analyst's work. Thus, a technical reviewer must be a qualified analyst in the methodology being reviewed.⁵ *Id.* at Stds. 5.5, 12.1.1. A technical review includes "an evaluation of reports, notes, data, and other documents to ensure there is an appropriate and sufficient basis for the scientific conclusions." *Id.* at Std. 12.1. Standard 12.2 sets forth the following requirements for a technical review:

STANDARD 12.2 Completion of the technical review shall be documented and the technical review of forensic casework shall include the following elements:

12.2.1 A review of all case notes, all worksheets, and the electronic data (or printed electropherograms or images) supporting the conclusions.

12.2.2 A review of all DNA types to verify that they are supported by the raw or analyzed data (electropherograms or images).

12.2.3 A review of all profiles to verify correct inclusions and exclusions (if applicable) as well as a review of any inconclusive result for compliance with laboratory guidelines.

12.2.4 A review of all controls, internal lane standards and allelic ladders to verify that the expected results were obtained.

12.2.5 A review of statistical analysis, if applicable.

12.2.6 A review of the final report's content to verify that the results/conclusions are supported by the data. The report shall address each tested item or its probative fraction.

12.2.7 Verification that all profiles entered into CODIS are eligible, have the correct DNA types and correct specimen category.

⁵ A technical reviewer should not be confused with a "technician." A technician works under the direction of a qualified analyst. FBI QAS, *supra*, at Std. 2 (definitions). A technical reviewer is a qualified analyst. *Id.* Accordingly, "[t]echnicians do not interpret data to reach conclusions on typing results or prepare final reports." *Id.*

12.2.7.1 Prior to upload to or search of SDIS, verification of the following criteria for DNA profiles: eligibility for CODIS, correct DNA types, and appropriate specimen category.

12.2.7.2 For entry into a searchable category at SDIS, verification of the following criteria for DNA profiles by two concordant assessments by a qualified analyst or technical reviewer: eligibility for CODIS; correct DNA types; and appropriate specimen category.

The QAS further requires the laboratory to document each element of the administrative and technical reviews. *Id.* at Std. 12.4.

To ensure that each laboratory employee involved in casework is proficient, the QAS requires that analysts, technical reviewers, and other relevant personnel periodically be “proficiency tested” in the technology they use in casework. *Id.* at Std. 13.1.4.1. In addition, the contributing laboratories must be audited annually to evaluate, confirm, and verify that laboratories are meeting the level of quality required. *Id.* at Std. 15.1.

B. This Case

1. The Crime and Subsequent Investigation

On January 19, 2008, L.J., a 19-year-old student, noticed someone who seemed to be following her as she walked home along Eutaw Street in Baltimore City. As L.J. put her keys into the front door of her apartment building, a man came up from behind her, held a knife to her throat, told her not to scream, and ordered her to open the door. Once inside L.J.’s apartment, the assailant forced her to engage in various sexual acts with him for approximately two hours.

During the assault, the assailant forced L.J. to touch his penis with her hand and perform fellatio on him multiple times. Following those acts, he ejaculated on her face, her

bedsheet, and pillowcase. He also attempted to penetrate her vagina, kissed her mouth, sucked her breasts, and forced her to shower with him. Later, the assailant saw a bottle of whiskey from which he drank and forced L.J. also to drink.

When the assailant decided to leave, he tied L.J. to a chair using electronics cords and exited with her keys, debit card, cash, and cellphone. L.J. eventually freed herself, escaped her apartment, and called the police from a neighbor's apartment. The responding officer transported L.J. to a nearby hospital, where a forensic nurse examiner conducted a SAFE Exam on L.J., during which the examiner swabbed L.J.'s body for DNA and took a sample of L.J.'s blood. Meanwhile, detectives collected forensic evidence at L.J.'s apartment.

Thirty-nine items were submitted to the Forensic Services Division of the Baltimore Police Department for analysis, including the evidence collected at L.J.'s apartment and during her SAFE Exam. On November 24, 2008, Thomas Hebert prepared a report stating the results and conclusions of that analysis (the "2008 report").⁶ The report contained forensic analysis of six items of evidence: (1) L.J.'s blood card (her known DNA sample); (2) swabs of L.J.'s left breast; (3) swabs of the electronics cords; (4) swabs of the whiskey bottle; (5) vacuum extraction of a washcloth; and (6) a sample from the pillowcase. The report also analyzed DNA collected from a plastic cup recovered by detectives following an interview with a person of interest (referred to in the report as "unknown male #2,"

⁶ The 2008 report is not part of the record in this case. The information concerning the 2008 report we include here comes from trial testimony.

although the contributor of that profile presumptively was the person of interest who had been interviewed). Mr. Hebert concluded that “unknown male #1” was the source of the DNA found on L.J.’s breast, the pillowcase, electronics cords, and the whiskey bottle. He ruled out the possibility that “unknown male #2” was a contributor to the DNA found on those items.

L.J. worked with the police to develop a computer composite sketch of the assailant. She also viewed photo arrays, but was unable to positively identify a suspect. By December 2008, the case had gone cold.

On February 2, 2017, Oliver Miller’s DNA sample was collected and processed in connection with an unrelated sexual assault case by Christy Silbaugh, another DNA analyst in the Forensic Sciences Division. Two months later, on April 3, 2017, the Baltimore Police Department received notification from CODIS of a “hit” in the system, which produced Miller’s DNA profile as a match with the DNA record associated with the pillowcase sample.⁷ As a result of that notification, Detective Justin Stinnett of the Cold Case Unit was assigned the case. Detective Stinnett made contact with L.J. for further investigation.

⁷ A CODIS/NDIS hit is “[a] confirmed match that aids an investigation and one or more of the case(s) involved in the match are unsolved.” FBI Laboratory, *National DNA Index System (NDIS) Operational Procedures Manual* (2021), available at <https://perma.cc/KZ3C-SMN5>. We presume that the DNA records and profiles generated from Mr. Hebert’s 2008 analysis were submitted to the statewide DNA database system, because a CODIS hit later produced Miller as a match of the DNA profile generated for “unknown male #1.” At trial, Miller moved to exclude any testimony regarding the CODIS hit. The State agreed that there would be no mention of CODIS or of the other sexual assault case, which led to law enforcement obtaining Miller’s known DNA profile.

He and another detective interviewed L.J. and showed her a photo array that included Miller. At that time, L.J. was unable to positively identify Miller as the assailant.

Using Miller's known sample, Mr. Hebert produced a "Supplemental Forensic Biology Report," dated May 9, 2017 (the "2017 report").⁸ The 2017 report concluded that Miller was "the source of the DNA profiles" generated from the pillowcase sample and the swabs of L.J.'s left breast. The report stated these conclusions with "a random match probability greater than 1 in 7.49 trillion," which "shows at least 99.9% confidence that the DNA profile is unique" in the world's population. The report further concluded that the DNA profiles generated from the swabs of the electronics cords (referred to in the 2017 report as "black wires") and whiskey bottle were "consistent with a mixture of [L.J.], Oliver Miller, and additional minor alleles from an unknown source." The report did not specifically identify the particular genetic makeup of either the DNA profile associated with "unknown male #1" in the 2008 report or the DNA profile that Ms. Silbaugh generated from Miller's known sample in 2017. That is, in the 2017 report, Mr. Hebert did not list particular alleles found at the particular loci that comprised the DNA profiles of "unknown male #1" and Miller. He only said that, based on the DNA profiles of the forensic evidence that previously had been analyzed and reported on November 24, 2008, and on Miller's known DNA profile, which had been analyzed and reported on February 2, 2017, Miller was the source of the DNA contained in the evidentiary samples collected from L.J.'s

⁸ A copy of the 2017 report (with the victim's name redacted to show just her initials) is provided as an appendix to this opinion.

person and apartment following the sexual assault. Mr. Hebert also provided other statistical analyses in the 2017 report in addition to that quoted above.

A grand jury in Baltimore City charged Miller with several offenses related to the sexual assault of L.J. in 2008.

2. Trial

Miller's jury trial began on June 7, 2018, in the Circuit Court for Baltimore City. At trial, the State produced several experts involved in the collection and analysis of the forensic evidence.⁹ However, Mr. Hebert – who, by the time of trial, had left the Baltimore Police Department and moved to Georgia – did not testify.

After becoming aware that Mr. Hebert might not testify, Miller's counsel moved to exclude the 2017 report,¹⁰ as well as Ms. Miller's and Ms. Morrow's testimony about the conclusions contained in the 2008 and 2017 reports, respectively. For purposes of the motion only, the defense introduced a copy of the 2017 report. Defense counsel argued that the admission of evidence relating to Mr. Hebert's analyses would violate the rule against hearsay, as well as Miller's constitutional right to confrontation. With respect to the confrontation challenge, defense counsel argued that the 2017 report was "testimonial"

⁹ The State called the mobile technician who processed the crime scene, the serologist who submitted the forensic evidence for DNA analysis, the forensic nurse examiner who collected samples from L.J. as part of the SAFE Exam, and the technical reviewers of the 2008 and 2017 reports (Ms. Miller and Ms. Morrow).

¹⁰ Defense counsel did not move to exclude Mr. Hebert's 2008 report, based on her apparent assessment that it was not "testimonial." However, the State did not introduce the 2008 report into evidence.

under *State v. Norton*, 443 Md. 517 (2015), either because it was a formalized document that stated facts relevant to a potential criminal prosecution, or because it was prepared for the primary purpose of accusing Miller. The prosecutor clarified that he did not intend to introduce the 2017 report into evidence if Mr. Hebert did not testify, but argued that admission of the testimony of Ms. Miller and Ms. Morrow, as the technical reviewers of the two reports, would not violate Miller's confrontation rights. According to the prosecutor,

the technical reviewer takes the evidence, takes the raw data and just goes through it as though they were going through the whole thing from the start, as though they were Mr. Hebert going through the whole thing from the start, and tests and retests each and every step through the process to make certain that these results are accurate.

Thus, according to the prosecutor, although "the actual physical paper DNA report might not be admissible as evidence" if Mr. Hebert did not testify, the two technical reviewers should be permitted to "testify regarding their review of Mr. Hebert's work and regarding his conclusions."

To resolve the issue, at the suggestion of the State, the trial judge decided to examine one of the technical reviewers – Ms. Morrow – outside the presence of the jury to determine the procedures she used to reach her conclusions as a technical reviewer. Ms. Morrow explained to the trial judge that it is common for more than one analyst to perform the "hands-on work" that goes into the preparation of a DNA report: "We do work together. So one analyst might perform the lab work. Multiple analysts might perform the lab work. But then all the data generated is reviewed by an analyst at the end who creates that report and then it starts the review process."

Ms. Morrow stated that Mr. Hebert was not responsible for all of the “hands-on work ... that went into the report.” Rather, as the creator of the report, “[h]e would just be responsible for reviewing the data at the end and drawing the conclusions, the statistics, and issuing the report.” Indeed, with respect to Mr. Hebert’s 2008 report, Ms. Morrow stated that she had been “responsible for the quantification, amplification and the electrophoresis of the portion of the victim’s blood card.” With respect to Miller’s known sample, Ms. Morrow explained that Mr. Hebert did not do the lab work that generated the DNA profile for Miller, and that a different analyst in the Forensic Services Division, Christy Silbaugh, issued the report that identified Miller’s DNA profile. Thus, Ms. Morrow affirmed that, in the 2017 report, Mr. Hebert “took ... his results from 2008 and he compared them with the results from the oral swab of Oliver Miller that were actually prepared by Christy Silbaugh” in connection with an unrelated case.

Regarding the review process after an analyst completes a report, Ms. Morrow explained:

We have two types of reviews in our office. We have something called a technical review and we have something called an administrative review. So when an analyst completes their case, they do something called an analyst review first where they go through their case folder, check all of their work. It goes on to a technical reviewer where the technical reviewer checks all of their documentation, checks that the proper procedures were followed, checks that all of the statements and conclusions are correct, checks the statistics, makes sure agreements are made with all of those things, they are consistent with the report and then the technical reviewer will sign off on that report.

Following that, we have an administrative review which is less of the technical aspects but covers things like typographical errors, numbering, the general documentation in the case folder, things like that.

Ms. Morrow subsequently expanded on the role of a technical reviewer in the crime lab:

Q [W]hat do you do as a technical reviewer?

A So as a technical reviewer, we have a checklist that we follow where we review all the work that was done. We make sure that we believe that the statements made are scientifically valid. We review all of the statistics. We make sure that we are in agreement with the report that has been authored. And then we document those agreements on our forensic biology document checklist and then sign and date it.

Q So in laymen's terms, would it be fair to say that you go step by step through the analysis and instead of actually having hands on and lab [sic], you're actually doing analysis with numbers?

A Right. We review all of the documentation in the case folder. So in this case, there was no lab work done by—if lab work is done, they'll review all of that documentation, they'll make sure it's complete, that protocols were followed, review the controls, everything that was generated in the case. And then review any conclusions and interpretations that were made.

....

Q ... [B]ased on your review of Mr. Hebert's report dated May 9th, 2017, are you able to adopt his conclusions as your own?

[DEFENSE]: Objection.

THE COURT: Overruled.

A I have reviewed all of his work and I have stated in the document review checklist that I do agree with all of his conclusions in his report and the statistical analysis, yes.^[11]

¹¹ Ms. Morrow stated that the crime lab maintains a "review sheet" in each "case folder" upon which "the analyst, the technical reviewer and the administrative reviewer will sign checking off boxes that they have reviewed each of these items." The "review sheet" for the 2017 report was not admitted as an exhibit at the hearing on the defense motion to exclude Ms. Morrow's testimony or during Ms. Morrow's testimony before the jury, and therefore is not part of the record of this case. However, it is undisputed that Ms. Morrow signed off on the 2017 report prior to its issuance.

Following Ms. Morrow's testimony, the trial court denied the motion to exclude her testimony.¹² Reflecting on the "protocols and standards" that Ms. Morrow discussed in her testimony outside the presence of the jury, the court observed:

[W]hat has impressed me is the fact that they look back over the data that's been generated. That is, the reviewers, the technical reviewers, in this case Ms. Morrow. And in other cases, where there's been challenges ... the Courts have said that it's all right for an expert to come in who actually didn't do the lab work, who didn't actually do the extraction and the amplification, things along those lines, but instead relies on the data generated by others' efforts in making their analysis and making their conclusion.

And that's what I think we have here. We have an individual who is reviewing step-by-step the process, the data generated and then looking to make sure (a) that the conclusion is correct based on the data and the process followed; and (b) not only that the conclusion is correct but there is a certain statistical analysis that goes along with that and ensure that that is done.

The court stated that it was not deciding whether the 2017 report was testimonial because the State was not going to offer it in evidence. The judge subsequently permitted Ms. Morrow to testify over Miller's continuing objection.

Before the jury, Ms. Morrow testified she was the technical reviewer of the 2017 report that Mr. Hebert had produced and that she reviewed his conclusions. She explained that the technical reviewer "reviews all of the documentation that's been done, all of the conclusions, all of the statistics and then signs off that they believe all of these are valid

¹² After the trial court stated that it was denying "the motion to have Ms. Morrow excluded," the defense did not ask for a ruling with respect to Ms. Miller's testimony as the technical reviewer of the 2008 report. However, when the State called Ms. Miller as a witness, defense counsel objected to her testimony on hearsay and confrontation grounds. The trial court overruled that objection. On appeal, Miller has not argued that the admission of Ms. Miller's testimony concerning the 2008 report was erroneous.

conclusions.” Asked whether a technical review is a “rubber stamp,” Ms. Morrow answered: “No. The technical review—we actually look at all of the data and we do review all of the statistics and all of the interpretation.”

Ms. Morrow explained that the 2017 report “compared all of the data from 2008 to another known individual,” and that the “known individual is Mr. Oliver Miller.” In stating the results of the various tests, Ms. Morrow used the exact language of the 2017 report in several instances. For example, Ms. Morrow testified that, as to the left breast swabs from 2008, “Oliver Miller is the source of the major portion of the profile.” The 2017 report contained the same language. Similarly, Ms. Morrow testified that the swabs of the black wires “yielded a DNA profile consistent with a mixture of [L.J.], Oliver Miller and additional minor alleles from an unknown source. Unknown male number 2 is excluded as a potential contributor to the DNA profile.” The 2017 report again included this exact language. The same occurred with respect to Ms. Morrow’s discussion of the swabs of the whiskey bottle. Using almost the exact language of the 2017 report, Ms. Morrow told the jury that “[t]he swabs of the whiskey bottle yielded a DNA profile consistent with a mixture of [L.J.], Oliver Miller and an additional minor allele from an unknown source. Unknown male number 2 is excluded as a possible contributor to the profile.” Ms. Morrow provided the statistical likelihood of a coincidental match for the mixed profiles from the black wires and the whiskey bottle, in both instances again using the same language that Mr. Hebert included in the 2017 report. She also testified that “Oliver Miller is the source of the DNA profiles” generated from the pillowcase, again using the same language that Mr. Hebert used in the 2017 report.

In his last question to Ms. Morrow in direct examination, the prosecutor asked: “And as a result of your technical review, do you agree with the conclusions that Mr. Hebert came to in this case?” Ms. Morrow answered, “I do, yes.” On cross-examination, Ms. Morrow acknowledged that she was not present “when any of this was analyzed.” Miller’s attorney did not question Ms. Morrow about the accuracy of her testimony that Miller’s known DNA profile matched the profile of “unknown male #1” whose DNA was found on the evidentiary samples taken from L.J. and her apartment. Nor did she cross-examine Ms. Morrow about the statistics she conveyed to the jury.

On June 14, 2018, the jury returned its verdicts, finding Miller guilty of first-degree rape, attempted first-degree rape, two counts of first-degree sex offense, three counts of third-degree sex offense, and false imprisonment. He was sentenced to an aggregate of 109 years of imprisonment.

3. Appeal

In his appeal to the Court of Special Appeals, Miller argued that Ms. Morrow’s testimony should have been excluded, and that the “erroneously admitted testimony” violated his rights to confront adverse witnesses under Article 21 of the Maryland Declaration of Rights and the Sixth Amendment to the United States Constitution. According to Miller, Ms. Morrow’s “testimony reading from Hebert’s report and endorsing its conclusions was testimonial” under *State v. Norton*. As Mr. Hebert was not available for cross-examination, Miller contended, the trial court should not have permitted Ms. Morrow to put Mr. Hebert’s conclusions before the jury. Miller also argued that the trial

court improperly imposed separate sentences for rape and attempted rape, and for multiple counts of third-degree sex offense.

With respect to Miller's confrontation argument, the State responded that the 2017 report was not "testimonial" and, therefore, there was no Article 21 or Sixth Amendment violation. Alternatively, the State argued that, even if the 2017 report was testimonial, Ms. Morrow, as the technical reviewer of that report, could testify concerning the report's conclusions without violating Miller's rights to confrontation and cross-examination.

The Court of Special Appeals held that the 2017 report was testimonial because it was both "formal" and "accusatory." *Miller v. State*, No. 2053, 2020 WL 737638, at *7 (Md. Ct. Spec. App. Feb. 12, 2020). The court reasoned that the trial court therefore violated Miller's constitutional rights to confrontation by allowing Ms. Morrow to "effectively read [the contents of the 2017 report] into evidence as the basis of her expert opinion." *Id.* The intermediate appellate court did not address the State's alternative argument that, as the technical reviewer of the 2017 report, Ms. Morrow was permitted to convey the information in the report to the jury without requiring Mr. Hebert to be available for cross-examination. Concluding that the confrontation error was not harmless beyond a reasonable doubt, the court remanded for a new trial. *Id.* at *8. Given this disposition, the court did not reach Miller's claim of sentencing error. *See id.* at *1.

Following the Court of Special Appeals' decision, the State filed a motion for reconsideration and stay of the court's mandate, which the Court of Special Appeals denied. On August 21, 2020, this Court granted the State's motion and stayed the enforcement of the intermediate appellate court's mandate, pending disposition of the

State’s petition for a writ of *certiorari*. In its petition, the State presented the following question:

Did the Court of Special Appeals err in concluding that the trial court violated Miller’s right to confrontation by admitting the results of DNA testing and analysis through a witness who did not author the report of DNA testing and analysis, but who served as its technical reviewer and thus performed the same analysis and reached the same results as the report’s author?

We granted the State’s petition on August 26, 2020. *State v. Miller*, 470 Md. 223 (2020).

II

Standard of Review

The decision to admit evidence is ordinarily reviewed for abuse of discretion. *See, e.g., Wheeler v. State*, 459 Md. 555, 560-61 (2018). However, this case presents a question of law. Accordingly, our review is *de novo*. *Langley v. State*, 421 Md. 560, 567 (2011). To the extent we are called upon to consider a mixed question of law and fact, that review is also *de novo*. *See, e.g., Cartnail v. State*, 359 Md. 272, 282 (2000).

III

Discussion

Article 21 of the Maryland Declaration of Rights, provides that, “[i]n all criminal prosecutions, every man hath a right ... to be confronted with the witnesses against him; ... [and] to examine the witnesses for and against him on oath.” Md. Decl. of Rts. art. 21. The Confrontation Clause of the Sixth Amendment to the United States Constitution provides a criminal defendant with the right “to be confronted with the witnesses against him.” U.S. Const. amend. VI.

In 1980, the Supreme Court held that, when a declarant is not present for cross-examination at trial, the declarant’s prior out-of-court statement is admissible “if it bears adequate ‘indicia of reliability,’” which may be inferred when the evidence “falls within a firmly rooted hearsay exception” or with “a showing of particularized guarantees of trustworthiness.” *Ohio v. Roberts*, 448 U.S. 56, 66 (1980). In *Crawford v. Washington*, 541 U.S. 36 (2004), the Supreme Court overruled *Ohio v. Roberts*. After examining the historical background of the Confrontation Clause, the Court stated that its “primary object” is “testimonial hearsay.” *Id.* at 53. The Court held that, under the Confrontation Clause, an absent witness’s out-of-court testimonial hearsay statement is inadmissible unless “the [witness] is unavailable[] and ... the defendant has had a prior opportunity to cross-examine.” *Id.* at 59. *Crawford* involved a tape-recorded statement to police by a witness in which she described a stabbing. There was no dispute that the witness’s statement was “testimonial.” However, the Court declined to provide a “comprehensive definition of ‘testimonial.’” *Id.* at 68.

Over the next decade, the Supreme Court considered the applicability of *Crawford* to forensic test results in a trio of cases, culminating in the Court’s fractured decision in *Williams v. Illinois*, 567 U.S. 50 (2012). As we explain in another decision we issue today, *Leidig v. State*, No. 19 (Md. Aug. 5, 2021), *Williams* revealed that there was not a majority position on the Supreme Court concerning the minimum requirements for a forensic test report to qualify as testimonial. *See Leidig*, slip op. at 1-2, 59-60. Justice Alito wrote an opinion for a four-Justice plurality in *Williams* in which he stated that, in order for a forensic report to be testimonial for purposes of a defendant’s right to confrontation, the

report must be “accusatory” – that is, it must have been prepared for the primary purpose of accusing the defendant of a crime. *Williams*, 567 U.S. at 82-84 (plurality op.).

Justice Thomas wrote an opinion concurring only in the judgment in which he reiterated his long-held view that, “to be testimonial within the meaning of the Confrontation Clause, the declarant must primarily intend to establish some fact with the understanding that his statement may be used in a criminal prosecution” *and* the statement must “bear[] the formality and solemnity necessary to come within the scope of the Clause.” *Id.* at 113-14 (Thomas, J., concurring). In Justice Thomas’s view, an affidavit or a sworn deposition or some other document that certifies the accuracy of its contents satisfies this formality/solemnity requirement. *See id.* at 111.

Justice Kagan wrote a dissenting opinion for herself and three Justices. *See id.* at 118-41 (Kagan, J., dissenting). The dissenting Justices would have applied a different “primary purpose” test that the Court had articulated in the post-*Crawford* case of *Davis v. Washington*, 547 U.S. 813 (2006), which did not concern a scientific report, but rather involved statements to a 911 operator and to police in response to investigative questioning. *See Williams*, 567 U.S. at 135 (Kagan, J., dissenting) (quoting *Davis*). In *Davis*, the Court held that such out-of-court statements are testimonial “when the circumstances objectively indicate that there is no ... ongoing emergency, and that the primary purpose of the interrogation is to establish or prove past events potentially relevant to later criminal prosecution.” 547 U.S. at 822.

With our decision in *Leidig*, we have adopted a standard under Article 21 for what makes a scientific report “testimonial,” thereby triggering the rights to confrontation and

cross-examination as a matter of Maryland constitutional law. Drawing upon *Crawford*, *Davis*, and Justice Kagan’s dissenting opinion in *Williams*, we hold in *Leidig* that, “under Article 21, a scientific report is ‘testimonial’ if the author of the report reasonably would have understood that the primary purpose for the creation of the report was to establish or prove past events potentially relevant to later criminal prosecution.” *Leidig*, slip op. at 3.

In this case, the State argued in the Court of Special Appeals that the 2017 report was not testimonial. The State alternatively argued that, if the 2017 report was testimonial, Ms. Morrow nevertheless could convey its results and conclusions to the jury, without violating Miller’s confrontation rights, because she was the report’s technical reviewer.

Before this Court, the State now concedes that the 2017 report was testimonial because it was “accusatory” under Justice Alito’s plurality opinion in *Williams* and this Court’s prior decision in *Norton* interpreting the various opinions in *Williams*. We agree that the 2017 report was testimonial. Thus, as the State acknowledges, an expert who had no prior connection to the 2017 report could not convey its conclusions to the jury without violating Miller’s rights under Article 21 and the Sixth Amendment. However, the State argues that Ms. Morrow was not just any expert witness; rather, she was the technical reviewer of the 2017 report. As such, Ms. Morrow independently verified Mr. Hebert’s results and conclusions and signed off on the report prior to its issuance, thereby adopting its results and conclusions. Thus, the State argues that Ms. Morrow did not impart testimonial hearsay, but rather conveyed her own independent opinions to the jury based on her own results and conclusions. In other words, according to the State, Ms. Morrow was the witness against Miller concerning the DNA profile match, not Mr. Hebert, and Mr.

Hebert therefore was not required to be present for cross-examination about his results and conclusions.

Miller argues in response that Ms. Morrow's status as the technical reviewer is immaterial. Rather, Miller contends, a witness like Ms. Morrow, who did not participate in, supervise, or observe any of the physical lab work underlying the DNA analysis cannot properly testify to that analysis without the analysts who did the lab work being present for cross-examination. In addition, Miller argues that, even if Ms. Morrow could testify about the analysis contained in the 2017 report, she improperly relayed Mr. Hebert's opinions to the jury by reading the report to the jury verbatim and stating that she agreed with the conclusions Mr. Hebert reached in the 2017 report. In other words, according to Miller, Ms. Morrow did not convey her independent opinions to the jury, but instead improperly provided the jury with Mr. Hebert's opinions.

As discussed below, we agree with the State. Where a testifying expert was the technical reviewer of a DNA report – and therefore, thoroughly reviewed the primary author's methods, results, and conclusions and signed off on the report prior to its issuance – the expert may convey information contained in the report to the trier of fact without the primary author also being available for cross-examination. In such an instance, the technical reviewer's testimony concerning the DNA analysis is not hearsay, but rather is the technical reviewer's independent opinion based on the reviewer's thorough, substantive

review of the report and adoption of its results and conclusions as their own. Such testimony does not violate Article 21 or the Sixth Amendment.¹³

A. Caselaw Concerning the Constitutional Implications of “Surrogate” Testimony in the Context of Scientific Reports

As noted above, in the decade following *Crawford*, the Supreme Court decided a trio of Confrontation Clause cases involving the meaning of “testimonial” in the context of scientific reports. First, in *Melendez-Diaz v. Massachusetts*, 557 U.S. 305 (2009), the Court held that the forensic reports at issue in that case fell within the “core class of testimonial statements” outlined in *Crawford*. *Id.* at 310. In that case, Melendez-Diaz had been charged with distributing and trafficking cocaine. *Id.* at 308. At trial, the court admitted into evidence “certificates of analysis,” the results of which stated that the substance seized from Melendez-Diaz contained cocaine. *Id.* The certificates were sworn to by the analysts before a notary public. *Id.* The analysts who prepared the certificates were absent from the trial. *Id.* Nor did any supervisors or other reviewers of the analysts’ work testify as expert witnesses to explain the testing procedures and the results of the tests. The trial court simply admitted the certificates into evidence over Melendez-Diaz’s objection that *Crawford* required the analysts to testify in person. *Id.* at 309. This was in keeping with a

¹³ In *Leidig*, we announced a standard under Article 21 to determine whether a scientific report is “testimonial” that differs from the Supreme Court’s understanding of what makes a scientific report “testimonial” for purposes of the Sixth Amendment. We explained our reasons for charting our own course concerning that particular question of confrontation jurisprudence. *See Leidig, supra*, slip op. at 59-63. In this case, the concerns that led us to interpret Article 21 differently than the Supreme Court has interpreted the Sixth Amendment are not present. Thus, we state our holding in terms of both Article 21 and the Sixth Amendment.

Massachusetts statute permitting the introduction of the certificates as “prima facie evidence of the composition, quality, and the net weight of the narcotic analyzed.” *Id.* (cleaned up).

Writing for a five-person Majority, Justice Scalia concluded that the certificates were admitted in violation of the Confrontation Clause. Among other reasons, the certificates were affidavits, *i.e.*, “declaration[s] of facts written down and sworn to by the declarant before an officer authorized to administer oaths.” *Id.* at 310 (quoting Black’s Law Dictionary 62 (8th ed. 2004)). Thus, the Majority ultimately held that the “case involve[d] little more than the application of our holding in *Crawford*,” as the “Sixth Amendment does not permit the prosecution to prove its case via *ex parte* out-of-court affidavits.” *Id.* at 329.

Two years later, the Court decided *Bullcoming v. New Mexico*, 564 U.S. 647 (2011). There, the Court considered whether a prosecutor may introduce a forensic laboratory report through the in-court “surrogate” testimony of an expert who neither signed the report nor performed or observed the analysis. *Bullcoming* was arrested for driving while intoxicated (DWI) and was convicted of aggravated DWI. *Id.* at 651. The sole evidence used to support his prosecution for aggravated DWI was a forensic laboratory report that certified his blood-alcohol concentration was above the threshold for that offense. *Id.*

At *Bullcoming*’s trial, the prosecution presented a “certificate of analyst,” which was signed by a forensic analyst (Curtis Caylor) assigned to test *Bullcoming*’s blood sample. *Id.* at 653. The State did not call Mr. Caylor to provide in-court testimony. *Id.* at 655. Instead, the prosecution called an expert (Gerasimos Razatos) who was familiar with

the process and procedures involved in the analysis, but who had “neither observed nor reviewed Caylor’s analysis.” *Id.* Over Bullcoming’s objection on confrontation grounds, the trial court admitted Mr. Caylor’s report as a business record during Mr. Razatos’s testimony. *Id.* at 655-56. Writing for the five-Justice majority, Justice Ginsburg explained that, under *Crawford* and *Melendez-Diaz*, Bullcoming had a right to confront the witness who prepared the report, and that the introduction of the report through “surrogate testimony” of an expert who neither signed the report nor performed or observed the test reported in it, does not pass constitutional muster. *Id.* at 652. The Court emphasized that “surrogate testimony of the kind Razatos was equipped to give could not convey what Caylor knew or observed about the events his certification concerned, *i.e.*, the particular test and testing process he employed. Nor could such surrogate testimony expose any lapses or lies on [Caylor’s] part.” *Id.* at 661-62 (footnotes omitted).

Justice Sotomayor wrote a concurring opinion observing that *Bullcoming* was “not a case in which the person testifying is a supervisor, reviewer, or someone else with a personal, albeit limited, connection to the scientific test at issue.” *Id.* at 672 (Sotomayor, J., concurring). Indeed, Justice Sotomayor noted, “Razatos conceded on cross-examination that he played no role in producing the ... report and did not observe any portion of ... Caylor’s conduct of the testing.” *Id.* at 672-73; *see also id.* at 673 (noting Mr. Razatos’s “total lack of connection to the test at issue”). Justice Sotomayor explained that the Court did not need to “address what degree of involvement is sufficient because here Razatos had no involvement whatsoever in the relevant test report.” *Id.*

Nor was the Court presented with this question in its third post-*Crawford* scientific evidence case, *Williams v. Illinois*. There, the report in question, which contained a male DNA profile generated from semen found in the forensic samples, was prepared by Cellmark Diagnostics, a private laboratory. *See Williams*, 567 U.S. at 59 (plurality op.). Two Cellmark laboratory directors signed the report. *See id.* at 61-64. The profile contained in the report was later matched to Williams’s reference profile, which had been acquired in another case. *See id.* At Williams’s trial, no Cellmark analyst testified, nor was the Cellmark report admitted into evidence or shown to the trier of fact (the trial judge). *See id.* at 61-62. Rather, a state forensic analyst, who (not surprisingly) had no connection to the testing done at Cellmark, compared the DNA profile in the Cellmark report to Williams’s reference DNA profile and testified that the two profiles matched. *Id.* Thus, the Court did not have an opportunity to further consider the question left unresolved in *Bullcoming* concerning the degree of involvement a supervisor or reviewer at the testing laboratory must have to qualify as an acceptable witness to convey the test results to the trier of fact.

This Court issued several decisions after *Williams* concerning whether a DNA report was testimonial. Relevant here, in *Cooper v. State*, 434 Md. 209 (2013), the trial court admitted a forensic analysis report authored by Sarah Shields (the “Shields report”) through the expert testimony of Ashley Fulmer, a supervisor at Bode, the private laboratory where Ms. Shields worked. Ms. Fulmer was the technical reviewer of Ms. Shields’s report. *See id.* at 219-20. Responding to questions concerning her qualifications to testify as an expert, Ms. Fulmer testified that, as a supervisor at Bode, she reviewed case files, among other

duties. *Id.* She also explained the difference between an “administrative review” and “a technical review.” An administrative review “evaluate[s] ... grammar, ... punctuation and that sort of stuff,” whereas in a technical review, she would “go through everything in the case, make sure procedures were followed, make sure things were tested in the right manner and all of that. Make sure that the results, any conclusions that were made were reported accurately.” *Id.* at 220. With respect to the report at issue in *Cooper*, Ms. Fulmer described her technical review: “When it comes to me for review, I have all the data that [Ms. Shields] generated in the processing of this case. I have her final case report. So I’ll sit down and make sure, like I said, that ... she performed the right procedures, that the data looks accurate and then I also agree with the results that she generated and issued in her report.” *Id.* at 221. The trial court overruled Cooper’s objection to Ms. Fulmer “giving any opinion of somebody else’s analysis,” ruling that Ms. Fulmer could testify “as an expert to the reports of another individual.” *Id.* at 222.

This Court held that the trial court properly admitted Ms. Fulmer’s testimony under Maryland Rule 5-703¹⁴ as the basis for Ms. Fulmer’s expert’s opinion. *Id.* at 230. We explained that “Maryland Rule 5-703(b) permits a trial judge, in his or her discretion, to admit evidence as the factual basis for the expert’s opinion if the evidence is unprivileged, trustworthy, reasonably relied upon by the expert, and necessary to ‘illuminate’ the expert’s

¹⁴ At the time, Rule 5-703(a) provided: “The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.”

testimony.” *Id.* We concluded that the Shields report satisfied all of those criteria. *See id.* at 230-31. In particular, we held that the trial court did not abuse its discretion in finding that the content of the report illuminated Ms. Fulmer’s conclusions based on Ms. Fulmer’s testimony describing her technical review of the report: “Fulmer testified that when she reviewed Shields’s work, she ‘ma[de] sure ... [Shields] performed the right procedures, that the data looks accurate and then I also agree with the results that she generated and issued in her report.’ In other words, Fulmer adopted the results in the Shields report.” *Id.* at 231 (alterations in original).

Although this Court concluded that there was an evidentiary basis to admit the Shields report in connection with Ms. Fulmer’s testimony, that did not end the inquiry. We then analyzed whether the admission of the report violated Cooper’s rights to confrontation. Concluding that the Shields report lacked formality and, therefore, was not testimonial under *Derr v. State*, 434 Md. 88 (2013) (“*Derr II*”),¹⁵ we held the report was

¹⁵ Prior to the Supreme Court deciding *Williams v. Illinois*, this Court issued its opinion in *Derr v. State*, 422 Md. 211 (2011) (“*Derr I*”), in which we held that the DNA “bench work” and rough notes at issue in that case were testimonial. *See id.* at 236-38. After issuing *Williams*, the Supreme Court vacated this Court’s judgment in *Derr I* and remanded the case for further consideration. *Maryland v. Derr*, 567 U.S. 948 (2012). On remand, we decided *Derr II* and declined to reinstate *Derr I* on independent state law grounds. *See Derr II*, 434 Md. at 104-05. Under *Marks v. United States*, 430 U.S. 188 (1977), the Majority in *Derr II* discerned Justice Thomas’s concurring opinion – and its requirement that an extrajudicial statement be formal in order for the statement to be testimonial – as the narrowest holding in *Williams*. *Derr II*, 434 Md. at 114. The Majority therefore stated that “forensic evidence must be at least formalized to be testimonial.” *Id.* at 118. We subsequently refined our analysis of *Williams* in *Norton*, directing Maryland courts to consider both Justice Thomas’s concurring opinion and Justice Alito’s plurality opinion in *Williams* when deciding whether a scientific report is testimonial. *See Norton*, 443 Md. at 547-48. *Cooper* was decided a few days after *Derr II* and before *Norton*. Thus,

not testimonial. Because the trial court did not abuse its discretion in admitting the report as “basis” evidence, and because the admission of the report did not violate Cooper’s confrontation rights, we affirmed Cooper’s convictions. *Cooper*, 434 Md. at 245.

In *Norton*, we held that the DNA report at issue in that case was testimonial under both Justice Thomas’s formality test and Justice Alito’s accusatory test, as expressed in their *Williams* opinions. *Norton*, 443 Md. at 548-49. Therefore, we held, that report “could come into evidence only if Norton had a chance to cross-examine the responsible analyst.” *Id.* at 552. In the case of Norton’s report, the testifying expert witness (Michael Cariola) had been the supervisor of the DNA analyst (Rachel Cline) who “conducted the DNA testing and prepared the report.” *Norton v. State*, 217 Md. App. 388, 392 (2014). Mr. Cariola testified that he had “reviewed all the materials, all of the notes, the lab notes, all of the data that was generated, the paperwork and the final report.” *Norton*, 443 Md. at 522. However, Mr. Cariola did not testify that he had done that review as part of the creation and issuance of the report. Nor did he sign the report. Rather, in addition to Ms. Cline, Susan Bach, identified as a “Forensic Casework Manager,” signed the report. *See id.* Ms. Bach, who Norton represented in his brief to this Court was the “technical reviewer who actually signed the Cline report,”¹⁶ did not testify at Norton’s trial. Thus, although we concluded that Mr. Cariola was not an appropriate witness to convey the results of the

the Court only considered Justice Thomas’s formality requirement in assessing whether the Shields report was testimonial.

¹⁶ Respondent’s Brief at 12, *State v. Norton*, 443 Md. 517 (2015) (No. 67), 2015 WL 1396231, at *12.

report to the jury, we did not decide whether the technical reviewer who signed Ms. Cline's report could have done so without violating Norton's confrontation rights.

B. Ms. Morrow's Testimony Reporting Her Own Independent Opinions Was Not Testimonial Hearsay.

We conclude that Ms. Morrow's testimony did not violate Miller's rights under Article 21 and the Sixth Amendment because she conveyed her independent expert opinions to the jury. The information she conveyed to the jury did not constitute hearsay. Thus, Ms. Morrow's testimony satisfied Miller's right to confront the witness against him: Ms. Morrow.

We reach this conclusion because Ms. Morrow conducted the technical review of the 2017 report and signed off on its issuance. She testified that, as the technical reviewer of the report, she reviewed "all of the documentation that's been done, all of the conclusions, all of the statistics and then sign[ed] off" on the report, indicating that she "believe[d] all of these are valid conclusions." Asked whether a technical review is a "rubber stamp," Ms. Morrow answered: "No. The technical review—we actually look at all of the data and we do review all of the statistics and all of the interpretation." In other words, Ms. Morrow adopted the conclusions in the 2017 report as her own prior to the issuance of the report. *Compare Cooper*, 434 Md. at 231 (explaining that, by conducting the technical review of the Shields report – *i.e.*, "mak[ing] sure . . . [Ms. Shields] performed the right procedures, that the data looks accurate and [that Ms. Fulmer] also agree[s] with the results that [Ms. Shields] generated and issued in her report," Ms. Fulmer "adopted the results in the Shields report"). Thus, when Ms. Morrow testified about the match between

Miller’s DNA reference profile and the DNA profile generated from evidentiary samples, she relayed the conclusions that she drew before she signed off on the report, based on her independent review of the same data upon which Mr. Hebert relied to draft the report. Ms. Morrow became the functional equivalent of a second author of the 2017 report by thoroughly reviewing all the underlying data, results, and conclusions, and then expressing her agreement with the report by signing off on it on the review sheet.

A technical reviewer’s adoption of a report’s results and conclusions – based on a complete review of the same data the primary author used, *and as part of the process of finalizing and releasing the report* – is the key distinction between the situation presented in this case and cases such as *Bullcoming* and *Norton*. The question presented in *Bullcoming* was: “Does the Confrontation Clause permit the prosecution to introduce a forensic laboratory report containing a testimonial certification ... through the in-court testimony of an analyst who did not sign the certification or personally perform or observe the performance of the test reported in the certification.” *Bullcoming*, 564 U.S. at 657. The Court answered that question in the negative, concluding that “surrogate” expert testimony by Mr. Razatos, who was familiar with the pertinent laboratory procedures, but who had “neither observed nor reviewed Caylor’s analysis,” was insufficient to satisfy the Confrontation Clause. *Id.* at 655. Clearly, Mr. Razatos had “reviewed” Mr. Caylor’s analysis by the time of trial. What concerned the Court on this point was the fact that Mr. Razatos did not have “any ‘independent opinion’ concerning *Bullcoming*’s [blood-alcohol concentration].” *Id.* at 662. Had Mr. Razatos signed the blood-alcohol concentration report, after conducting a technical review of Mr. Caylor’s analysis, Mr. Razatos’s sign-off as the

technical reviewer would have evidenced his having independently reviewed Mr. Caylor's analysis and his opinion that the analysis was accurate.

Similarly, in *Norton*, Mr. Cariola had reviewed Ms. Cline's final report as well as all the materials, lab notes, and data that was generated. 443 Md. at 522. However, Mr. Cariola did not sign the report, nor did he testify that he conducted his review in connection with the creation of the report. A different lab employee, Ms. Bach, who apparently had conducted the technical review, signed the report below Ms. Cline. While Mr. Cariola's "review" of the report did not qualify him to convey its results and conclusions as his own, we did not opine whether Ms. Bach's technical review and her signature on the report meant that Ms. Bach could have testified as to the results and conclusions of Ms. Cline's analysis without violating Norton's confrontation rights.

Notably, in her concurring opinion in *Bullcoming*, Justice Sotomayor wrote that the case before the Court was not one "in which the person testifying is a supervisor, reviewer, or someone else with a personal, albeit limited, connection to the scientific test at issue." 564 U.S. at 672 (Sotomayor, J., concurring). Indeed, Justice Sotomayor noted Mr. Razatos's "total lack of connection to the test at issue." *Id.* at 673. Justice Sotomayor observed that the Court did not need to "address what degree of involvement is sufficient because here Razatos had no involvement whatsoever in the relevant test and report." *Id.*

We conclude that Ms. Morrow's "degree of involvement" in the creation of the 2017 report qualified her to convey the information in the report to the jury without violating Miller's rights to confrontation. Ms. Morrow's "involvement" with the 2017 report required her to: (1) thoroughly review all the data that Mr. Hebert used; (2) independently

determine whether or not Mr. Hebert's results and conclusions were correct; and (3) if they were correct, sign off on the report's issuance. In our view, this degree of involvement made Ms. Morrow the functional equivalent of a second author of the report and thus rendered her testimony concerning the information contained in the report nonhearsay.

We find support for this conclusion by reference to the FBI's Quality Assurance Standards for Forensic DNA Testing Laboratories, to which participants in CODIS and NDIS must adhere. The Standards require laboratories to "conduct and document ... technical reviews of all case files and reports to ensure conclusions and supporting data are reasonable and within the constraints of scientific knowledge." FBI QAS, at Std. 12.1. The QAS also define the role and responsibilities of a technical reviewer. Among other things, Standard 12.2 requires that a technical review include:

12.2.1 A review of all case notes, all worksheets, and the electronic data (or printed electropherograms or images) supporting the conclusions.

12.2.2 A review of all DNA types to verify that they are supported by the raw or analyzed data (electropherograms or images).

12.2.3 A review of all profiles to verify correct inclusions and exclusions (if applicable) as well as a review of any inconclusive result for compliance with laboratory guidelines.

12.2.4 A review of all controls, internal lane standards and allelic ladders to verify that the expected results were obtained.

12.2.5 A review of statistical analysis, if applicable.

12.2.6 A review of the final report's content to verify that the results/conclusions are supported by the data. The report shall address each tested item or its probative fraction.

The QAS further requires the laboratory to document each element of the technical review. *Id.* at Std. 12.4.

The QAS's requirements for a technical review are comprehensive. Compliance with these standards requires testing laboratories to dedicate substantial resources to quality control. In essence, a second analyst must follow behind the original analyst and check everything the original analyst did. In doing so, the Standards help ensure that DNA profile information ultimately entered into CODIS and NDIS is accurate and, thus, when a match subsequently occurs within CODIS, the match accurately reflects a basis for further investigation and potential prosecution.

As noted at the outset of this opinion, the sexual assault of L.J. quickly went from a nine-year-old cold case to a charged case as a direct result of a CODIS hit after Miller's known reference sample was entered into the system. This case is just one of more than 500,000 instances in which a CODIS hit has generated a lead for law enforcement. CODIS provides an immensely powerful tool for law enforcement. That type of tool requires accountability. The requirement of a robust technical review of *all* case files and reports helps foster that accountability within the many laboratories that conduct DNA analyses across the United States.

This standardized requirement of accountability convinces us that an analyst who conducts a technical review of a report, and who ultimately agrees with the report's results and conclusions and signs off on its issuance, should be deemed the functional equivalent of a second author of the report. Absent the technical reviewer's approval following their substantive review of the report, the laboratory does not issue the report. In other words,

the technical reviewer is accountable for the substance of the report. Testimony by a technical reviewer concerning the results and conclusions contained in the report that the reviewer adopted as their own is not hearsay. Put another way, because the technical reviewer has done a thorough review of all aspects of the primary author's analysis and signed off on the report before its issuance, the technical reviewer qualifies as a "responsible analyst" whom the defendant has a right to cross-examine. *Norton*, 443 Md. at 552.¹⁷

Our conclusion is in keeping with authority from other jurisdictions. In *Galloway v. State*, 122 So.3d 614 (Miss. 2013), Galloway moved to exclude the testimony of Bonnie Dubourg, a forensic DNA analyst whose lab conducted DNA testing on blood and tissue samples. *See id.* at 635. Ms. Dubourg did not do the tests herself; the analyst who had conducted the tests was Julie Golden, another DNA analyst at the same lab. *See id.* at 635-36. Ms. Dubourg was Ms. Golden's technical reviewer. *Id.* at 637. Galloway objected to Ms. Dubourg's testimony, contending that it was the type of surrogate testimony that *Bullcoming* prohibits. In particular, Galloway contended that Ms. Golden was a necessary

¹⁷ In *Cooper*, we held that the Shields report was admissible under Maryland Rule 5-703 as the basis for Ms. Fulmer's opinion. 434 Md. at 230. However, we then went on to analyze whether the admission of the report violated Cooper's confrontation rights; we held that there was no constitutional violation because the Shields report was not "formal" enough to be testimonial. *See id.* at 231-36. If we were to decide *Cooper* today, we likely would reach the same result but for different reasons. Under *Leidig*, we likely would conclude, contrary to our decision in *Cooper*, that the Shields report was testimonial. However, the information contained in the Shields report likely was admissible through the testimony of Ms. Fulmer because she was the technical reviewer of the Shields report. *See id.* at 221.

witness to answer questions about “her critical tasks of initial presumptive testing, DNA extraction (including the differential extraction of the DNA on a vaginal swab), DNA quantitation, polymerase chain reaction (PCR), the separation and detection of PCR-produced STR (short tandem repeat) alleles and the production of electropherograms through electrophoresis.” *Id.* Galloway also argued that “only Golden could have been examined concerning possible contamination of the samples and her vigilance in attempting to prevent it.” *Id.*

The Supreme Court of Mississippi rejected Galloway’s contentions, relying on Ms. Dubourg’s technical review to conclude that she was a proper witness to testify about the conclusions set forth in Ms. Golden’s report:

Distinguishable from *Bullcoming*, the record here illustrates that Dubourg, as the technical reviewer assigned to the case, was familiar with each step of the complex testing process conducted by Golden, and Dubourg performed her own analysis of the data.... Dubourg personally analyzed the data generated by each test conducted by Golden and signed the report. Given Dubourg’s knowledge about the underlying testing process and the report itself, any questions regarding the accuracy of the report due to possible contamination of the DNA samples could have been asked of Dubourg.

Id. at 637-38; *see also Ex parte Ware*, 181 So.3d 409, 412, 416-17 (Ala. 2014) (affirming admission of Cellmark DNA report into evidence through the testimony of a Cellmark molecular geneticist, who supervised and reviewed the testing and analysis in question and who signed the report; the witness testified that, “as the reviewer of all the work done in this case,” he had reviewed “all the analyses that were performed to ensure that they were performed in accordance with Cellmark’s standard operating procedures and also ensured that the conclusions drawn from the data were accurate and appropriate as well.”) (cleaned

up); *cf. State v. Lebrick*, 223 A.3d 333, 353-57 (Conn. 2020) (testimony of ballistics technical reviewer did not violate the Confrontation Clause, where the witness’s testimony was based on his “independent judgment, the basis of which could be tested through cross-examination”) (cleaned up); *State v. Watson*, 185 A.3d 845, 858-59, 859 n.3 (N.H. 2018) (permissible for analyst to testify concerning toxicology test results where, although he did not perform the testing, he had “reviewed all of the testing results” during the preparation of the report and he “testified to his own, independent conclusions”; and collecting decisions of “at least seven federal courts and 21 state courts, which, in opinions since 2012, have found no Confrontation Clause violation under similar circumstances”).

The cases that Miller cites do not persuade us to the contrary. In *Gardner v. United States*, 999 A.2d 55, 59 (D.C. 2010), two testifying experts testified concerning DNA test results. Neither testifying expert had performed the testing or supervised the analyst who conducted the tests. Rather, both experts were the technical reviewers of the lab reports. *Id.* The trial court admitted the reports into evidence, and the testifying experts read directly from the reports; one of the witnesses “referred to enlarged copies of the lab report ... to help her explain the testing process and the results.” *Id.* The District of Columbia Court of Appeals held that the admission of the reports and the testimony of the expert witnesses violated the Confrontation Clause. *See id.* at 60-61. Although the *Gardner* Court referred to the expert witnesses as technical reviewers, it is not clear from the opinion whether the prosecution laid a foundation that would have allowed the trial court to conclude that the witnesses had actually conducted the type of thorough review of the testing analysts’ work and results that we deem critical. What is clear is that the *Gardner* Court did not refer to

the FBI's Quality Assurance Standards or consider whether a technical reviewer who conducts the type of review of a DNA report contemplated by those Standards should be considered the functional equivalent of a second author of the report.

Other cases upon which Miller relies distinguish between an expert who, while not the author of a DNA report, participated in or observed some of the testing, and an expert who did not have any role at all in the testing and only later reviewed a DNA report. Mr. Razatos, the testifying expert in *Bullcoming*, is an example of the latter. One example of the former was the testifying expert in *State v. Medicine Eagle*, 835 N.W.2d 886 (S.D. 2013), which Miller cites in his brief. In that case, Barbara Leal, a forensic DNA analyst, performed some of the bench work that led to the generation of two DNA profiles and wrote the testing lab's report concerning one of the profiles. *Id.* at 890-91, 895. She was the only analyst who testified at Medicine Eagle's trial. The Supreme Court of South Dakota found no error in the admission of Ms. Leal's testimony in which she provided results of both tests:

Leal participated in various steps of both the 2008 and 2011 testing and even wrote the original report regarding the results of the 2011 Y-STR testing. Also, Leal independently reviewed, analyzed, and compared the data obtained during the 2008 Y-STR testing. She then came to her own independent conclusions about whether Medicine Eagle could be excluded as a contributor to the samples. In addition, the 2008 and 2011 Y-STR testing reports were not introduced at trial through Leal. Instead, only the chart Leal created, which contained a summary of her conclusions and statistical calculations for each sample, was admitted into evidence. Further, Leal only testified about her own conclusions and statistical calculations. Finally, Medicine Eagle had an adequate opportunity to cross-examine Leal at trial regarding her conclusions and statistical calculations. Therefore, under the circumstances of this case, we conclude that Medicine Eagle's Sixth Amendment right to confrontation was not violated by the trial court's admission of Leal's testimony regarding the 2008 and 2011 Y-STR testing,

even though analysts who performed some steps of the 2008 and 2011 Y-STR testing did not testify at trial.

Id. at 898-99 (footnote omitted).

We do not see why Ms. Leal’s testimony in *Medicine Eagle* concerning the 2008 Y-STR testing should be permissible under the Sixth Amendment, while Ms. Morrow’s testimony as the technical reviewer of the 2017 report should be held to have violated Miller’s confrontation rights. We perceive no reason why a technical reviewer, who signs off on a report after checking all of the primary author’s work, would not be able to speak just as authoritatively to the accuracy of the report as a whole than an analyst who did some of the bench work that led to the creation of the report and years later independently reviewed the entire case file.¹⁸

Finally, we take note of Miller’s argument that “Morrow – who did not participate in, supervise, or observe any of the 2017 bench work – should not have been permitted to vouch for the testing, or to relay the results of the testing.” However, as was clear to

¹⁸ Miller also analogizes this case to *Derr I*, in which this Court held that an FBI supervisor’s testimony that incorporated the results of bench work performed by other analysts violated the Confrontation Clause. *See Derr I*, 422 Md. at 245-49. As noted above, this Court declined to reinstate *Derr I* on state law grounds after the Supreme Court vacated the judgment and remanded the case. Even if any portion of *Derr I* could be thought to remain precedential, we believe *Derr I* placed an unreasonable constraint on the ability of the State to present cases involving DNA evidence. Under *Derr I*’s rationale, in every case involving DNA evidence, the State arguably would be required to present the testimony of every analyst who performed any part in the bench work that led to the generation of a DNA profile. In *Leidig*, we disapprove such an approach, and instead instruct that to satisfy Article 21, “the state need only call as a witness an analyst with personal knowledge concerning the accuracy of the numerical DNA profile generated from the preliminary stages of testing.” *Leidig, supra*, slip op. at 67-68 (quoting *State v. Walker*, 212 A.3d 1244, 1267 (Conn. 2019)).

Miller's trial counsel, Mr. Hebert also did not participate in, supervise, or observe any of the 2017 bench work, or have anything to do with that analysis. Rather, a different analyst, Christy Silbaugh, was responsible for the 2017 analysis that generated Miller's reference DNA profile after the Forensic Services Division obtained Miller's known standard in connection with an unrelated sexual assault case. In the trial court and on appeal, Miller did not argue that Mr. Hebert also would have been an improper witness to convey the results of the 2017 analysis, and that the State needed to call Ms. Silbaugh as a witness. To the extent Miller now effectively argues that the State should have produced Ms. Silbaugh, not Mr. Hebert, that argument is waived.¹⁹

We add two important points. First, this case would be different if Ms. Morrow had been the administrative reviewer of the 2017 report. As the QAS explain, an administrative review is an evaluation of the analyst's final report and its supporting documentation "for consistency with laboratory policies and for editorial correctness." FBI QAS, at Std. 2 (definitions). Under the QAS, an administrative reviewer must:

¹⁹ Ms. Morrow was the technical reviewer of the 2017 report produced by Mr. Hebert, not Ms. Silbaugh's report. There was not much to technically review in Mr. Hebert's report. Mr. Hebert did not report on the lab work that Ms. Silbaugh had done in 2017 (or on the lab work that was done in 2008 to generate the DNA profile of "unknown male #1"). Rather, Mr. Hebert wrote in the 2017 report that Miller was the source of the DNA found in the various forensic samples – *i.e.*, that the profiles matched. He also provided statistical information. When Ms. Morrow reviewed the 2017 report, the substantive points she needed to verify were that Mr. Hebert had accurately compared the 2008 and 2017 profiles and had computed the listed probabilities accurately. In the trial court and on appeal, Miller has not contended that Mr. Hebert incorrectly concluded the profiles matched or that his statistical analyses were flawed in any respect. Nor has Miller challenged the sufficiency of the evidence supporting his convictions.

- review the case file and final report for clerical errors and ensure relevant case information is included in the report and accurate;
- review the chain of custody and disposition of the evidence; and
- follow the laboratory’s administrative review documentation procedures.

See id. at Std. 12.3.

A technical review is a review for substance; an administrative review is not. *See Cooper*, 434 Md. at 219-20 (summarizing witness testimony distinguishing between an administrative review and a technical review). Unlike a technical reviewer, an administrative reviewer cannot be viewed as the functional equivalent of a second author of the report.²⁰

Second, the label “technical reviewer” does not automatically entitle a witness to convey information in a DNA report to the trier of fact in place of the primary author. If challenged, the State must lay a foundation demonstrating that the witness performed the type of thorough, substantive review of the primary author’s work that the QAS contemplate a technical review will encompass.²¹ If a purported technical reviewer did not conduct a sufficiently thorough review, the trial judge should exclude any testimony that conveys information contained in the DNA report. On the other hand, if the State lays a

²⁰ Thus, in *Leidig*, we hold that the admission of a testimonial DNA report through the testimony of an administrative reviewer violated the defendant’s rights to confrontation and cross-examination under Article 21. *See Leidig, supra*, slip op. at 69-70.

²¹ Voir dire of the proffered technical reviewer expert outside the presence of the jury, as was done in this case, will often be an appropriate way for a trial judge to determine whether the witness actually conducted a sufficient technical review.

sufficient foundation to satisfy the trial judge that the technical reviewer is, in fact, a “responsible analyst” with respect to the results and conclusions contained in the report, the trial judge should permit the testimony.

C. Any Error in Referring to Mr. Hebert During Ms. Morrow’s Testimony Was Harmless.

Miller complains that, in two instances, Ms. Morrow explicitly referenced Mr. Hebert’s conclusions in her testimony. First, on direct examination, after Ms. Morrow stated that she had reviewed a DNA analysis report dated May 9, 2017, the following testimony occurred:

Q All right. The conclusions that were reached as part of that DNA analysis, whose conclusions were those?

A Those are the conclusions of the analyst, Thomas Hebert.

Second, at the end of Ms. Morrow’s direct examination, the following occurred:

Q And as a result of your technical review, do you agree with the conclusions that Mr. Hebert came to in this case?

A I do, yes.

Miller contends that these references to Mr. Hebert’s conclusions with which Ms. Morrow agreed demonstrates that Ms. Morrow did not convey her independent opinions to the jury, but instead improperly related testimonial hearsay statements of Mr. Hebert.

It was appropriate for the State to elicit information about Ms. Morrow’s role in the process as a technical reviewer so that the jury could properly assess her testimony. That entailed the jury learning that Mr. Hebert was the primary author of a DNA report and that Ms. Morrow reviewed his work to come to her independent opinions concerning the results

and conclusions of the analysis. Thus, Ms. Morrow permissibly testified that the technical reviewer “reviews all of the documentation that’s been done, all of the conclusions, all of the statistics and then signs off that they believe all of these are valid conclusions.” She made clear that a technical review is not a “rubber stamp,” and reiterated that “we actually look at all of the data and we do review all of the statistics and all of the interpretation.” While the State muddied the waters somewhat by eliciting that the conclusions contained in the report were Mr. Hebert’s and that Ms. Morrow agreed with those conclusions, Ms. Morrow’s testimony as a whole established that she was conveying her independent opinions based on her technical review of the case file.

However, to the extent the inartful questioning quoted above resulted in the jury learning that a non-testifying analyst agreed with Ms. Morrow, arguably vouching for Ms. Morrow’s opinions, the error was harmless beyond a reasonable doubt. Miller did not contest the substance of Ms. Morrow’s opinions. He did not cross-examine her about her conclusion that the profiles matched or about the statistics she conveyed to the jury. Under these circumstances, we perceive “no reasonable possibility” that these brief and isolated references to Mr. Hebert’s conclusions “may have contributed to the rendition of the guilty verdict.” *Dorsey v. State*, 276 Md. 638, 659 (1976).²²

²² Miller also complains that Ms. Morrow read verbatim from Mr. Hebert’s report, rather than providing her own independent opinions. We discern no error in Ms. Morrow’s using the same language in her testimony that Mr. Hebert used in the 2017 report. As we have explained, as the report’s technical reviewer, Ms. Morrow is properly viewed as the functional equivalent of a second author of the report. Thus, to the extent Ms. Morrow used language that came directly from the 2017 report, there was no error because she had previously adopted those words as her own.

IV

Conclusion

As the technical reviewer of Mr. Hebert's 2017 report, Ms. Morrow was permitted to convey information contained in that report to the jury without violating Miller's rights under Article 21 and the Sixth Amendment. Ms. Morrow thoroughly reviewed all the data and all the conclusions of the report and signed off on it prior to its issuance. As such, she became the functional equivalent of a second author of the report. It follows that Ms. Morrow did not impart testimonial hearsay to the jury, but, rather, conveyed her own independent opinions based on her independent review of the same data Mr. Hebert had reviewed. Any error in Ms. Morrow's references to Mr. Hebert and his conclusions was harmless beyond a reasonable doubt.

For these reasons, we reverse the judgment of the Court of Special Appeals and reinstate Miller's convictions. We remand the case to the intermediate appellate court to rule on the sentencing issue that the court did not reach in light of its disposition of Miller's appeal.

JUDGMENT OF THE COURT OF SPECIAL APPEALS REVERSED AND CASE REMANDED TO THE COURT OF SPECIAL APPEALS FOR FURTHER PROCEEDINGS CONSISTENT WITH THIS OPINION. COSTS IN THE COURT OF SPECIAL APPEALS AND THIS COURT TO BE PAID BY PETITIONER.

APPENDIX



BALTIMORE POLICE DEPARTMENT
Forensic Services Division
601 E. Fayette St.
Baltimore, MD 21202

Supplemental Forensic Biology Report
Date Prepared: May 9, 2017

To: Det. Stinnett
Unit: CID/SOU
Offense: Rape

CC#: 081A09117
Biology #: B08-0438
Victim: L.J. L.J.

The following samples were previously analyzed and reported on November 24, 2008 using previously validated protocols for interpretation and statistical analysis.

- | | |
|---|-----------------------------|
| 1- Portion of victim's blood card | Property # 08003797.1G.1 |
| 2- L. breast swabs | Property # 08003797.1H.2a-b |
| 3- Swabs of black wires | Property # 08003747.1A |
| 4- Swabs of whiskey bottle | Property # 08003749.1A.1-2 |
| 5- Vacuum extraction of washcloth | Property # 08003756.1A |
| 6- Sample from stain 5 of yellow pillowcase | Property # 08003754.2B.5a |

The following sample was previously analyzed under B08-0529, CC# 081J15046 and reported on November 24, 2008.

- | | |
|---|--------------------------|
| 7- Swabs from lip of plastic cup recovered from Brian Jones | Property # 08065500.1A-B |
|---|--------------------------|

The following sample was previously analyzed under 7-161101524 and reported on February 2, 2017.

- | | |
|---------------------------------|------------------------|
| 8- Oral swab from Oliver Miller | Property # 17001198.1A |
|---------------------------------|------------------------|

The DNA analysis reported was performed using procedures that have been validated according to the Federal Bureau of Investigation's Quality Assurance Standards for Forensic DNA Testing Laboratories. Polymerase Chain Reaction (PCR) testing was performed using extracted DNA. The short tandem repeat (STR) loci D3S1358, D1S1656, D2S441, D10S1248, D13S317, Penta E, D16S539, D18S51, D2S1338, CSF1PO, Penta D, TH01, vWA, D21S11, D7S820, D5S818, TPOX, D8S1179, D12S391, D19S433, FGA, D22S1045, DYS391, and amelogenin (gender indicator) were tested and the following conclusions are based on the data.

Sample 1

The portion of the victim's blood card yielded a full, female DNA profile.

Sample 2

The left breast swabs yielded a DNA profile consistent with a major portion and alleles from L.J. L.J. Oliver Miller is the source¹ of the major portion of the profile.

Sample 3

The swabs of the black wires yielded a DNA profile consistent with a mixture of L.J. L.J. Oliver Miller, and additional minor alleles from an unknown source. Unknown male #2 is excluded as a possible contributor to the DNA profile. The chances of selecting an unrelated individual from a random population as a possible contributor to the evidence sample at the tested loci are approximately:

- 1 in 155 thousand (155,000) individuals in the American Caucasian population
- 1 in 64.0 thousand (64,000) individuals in the African American population
- 1 in 155 thousand (155,000) individuals in the SE Hispanic American population

Sample 4

The swabs of the whiskey bottle yielded a DNA profile consistent with a mixture of L.J. L.J. Oliver Miller, and an additional minor allele from an unknown source. Unknown male #2 is excluded as a possible contributor to the DNA profile. The chances of selecting an unrelated individual from a random population as a possible contributor to the evidence sample at the tested loci are approximately:

- 1 in 1.65 million (1,650,000) individuals in the American Caucasian population
- 1 in 330 thousand (330,000) individuals in the African American population
- 1 in 1.64 million (1,640,000) individuals in the SE Hispanic American population

Sample 5

The vacuum extraction of the washcloth yielded a partial DNA profile consistent with an indeterminate² mixture of at least two individuals.

Sample 6

The sperm fraction and non-sperm fraction of sample A from stain 5 of the yellow pillowcase each yielded a single source, male DNA profile. Oliver Miller is the source¹ of the DNA profiles.

Sample 7

The swabs from the lip of the plastic cup recovered from Brian Jones yielded a DNA profile from an unknown male (Unknown male #2).

Sample 8

The oral swab from Oliver Miller yielded a full, male DNA profile.

All eligible profiles have been entered and searched in the Combined DNA Index System (CODIS). If a positive association occurs, you will be notified in writing.

All relevant samples have been retained by the Baltimore Police Department as required by the Annotated Code of Maryland.

This report contains conclusions based on the interpretation and opinions of the below signed author.

This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1857.

TMH
Thomas M Hebert, MS
Forensic Scientist II - DNA Analyst

Date Issued:
5/30/17

¹ Based on an estimated world population of approximately 7.5 billion (7,500,000,000) people, a random match probability greater than 1 in 7.49 trillion (7,490,000,000,000) shows at least 99.9% confidence that the DNA profile is unique in the population.

² Due to the complexity of the genetic information available or the possibility of incomplete detection of genetic information, no definitive conclusions can be made whether an individual may or may not be a contributor to the DNA profile.