IN THE UNITED STATES DISTRICT COURT FOR
THE NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION

DONNA CURLING, et al. Plaintiff, vs. BRIAN P. KEMP, et al. Defendant.	)))))))))))))

CIVIL ACTION FILE NO.: 1:17-cv-2989-AT

SEVENTH DECLARATION OF PHILIP B. STARK

PHILIP B. STARK hereby declares as follows:

1. This statement supplements my declarations of September 9, 2018; September 30, 2018; October 22, 2019; December 16, 2019; August 23, 2020; and August 31, 2020. I stand by everything in the previous declarations.

2. In his testimony on 11 September 2020, Defendant's expert Dr. Ben Adida made a number of incorrect assertions about risk-limiting audits (RLAs), including how they work, when they are applicable, and what they accomplish; he also misrepresented the conclusions of two papers on voters' ability to verify BMD printout. I shall try to clarify some of the errors.

3. The "risk" that a risk-limiting audit was invented to limit—the reason for its name—is the risk of certifying a reported electoral outcome that is incorrect. That risk is not merely from tabulation errors, nor is hacking the only source of the risk. There are risks from

procedural errors, misconfiguration, broken chain of custody, machine malfunctions, human malefactors, etc.

4. By "outcome," I mean the political outcome: which candidate or candidates won the contest. I do not mean the specific numerical vote tally.

5. An RLA using a trustworthy paper trail can limit the risk of certifying an electoral outcome that is wrong: this is the fundamental purpose of an RLA. Applying RLA procedures to an untrustworthy paper trail cannot limit the risk of certifying a wrong outcome. (There might be other reasons for applying RLA procedures to an untrustworthy paper trail, but it cannot accomplish the fundamental purpose of an RLA.)

6. A paper trail can be untrustworthy for audit or recount purposes for many reasons, including compromised chain of custody.

7. Hand-marked paper ballots are not automatically trustworthy, but suitable "compliance audits" can establish whether hand-marked paper ballots are trustworthy. In contrast, there is no audit or test that can establish whether BMD printout is trustworthy. The fact that a voter has the *opportunity* to check BMD printout does not make BMD printout trustworthy, as Dr. Adida testified. That is why it is so important to keep the use of BMDs to a minimum. Relying on BMD printout for an audit is like checking an expense report by verifying the addition alone, without verifying the reported expenses against receipts.

8. Dr. Adida testified, on the basis of papers cited in my previous report, that voters who use BMDs "absolutely can verify their ballots." That is not what the academic studies conclude nor what the voters' declarations and pollwatcher observations in the record in this case demonstrate.

9. It is an unfortunate historical fact that election integrity advocates focused on the word "verifiable" for the last two decades, which creates a false impression that hand-marked paper ballots and printout from voting machines are equivalent from a security standpoint, because both are—in theory—"verifiable" by the voter. But the difference between hand-marked paper ballots and BMD printout is more fundamental: with a hand-marked paper ballot, the paper record necessarily reflects what the voter did. With BMD printout, the paper record does not necessarily reflect what the voter did. With both systems, voters are responsible for their own errors; with BMDs, voters are also responsible for catching machine malfunctions, hacking, etc.—that is, voters are responsible for the security of the system. Research shows that a substantial percentage of voters cannot perform that task, even when they try.[1] And as I testified in court, virtually every voter must perform that function well for election results to be trustworthy: even 76 percent is not enough.

10. Bernhard et al. (2020) find that signage does not induce voters to check BMD printout. They find that verbal reminders just before voters put their ballots in the scanner can help, but not enough to make the system secure. Dr. Adida and the Defendants are arguing that because it is theoretically possible for voters to check, the system is trustworthy.

11. Universal-use BMD systems are ill conceived because their security requires *all* voters to do something *few* voters do: check the printout thoroughly and request another opportunity to mark a ballot if the printout contains errors. As I testified, even if the vast majority of voters checked the printout, caught errors, and requested a fresh opportunity

---

[1] Bernhard et al. (2020); Kortum et al. (2020).

to mark a ballot, that would not suffice to ensure that BMD malfunctions do not change the outcome of one or more contests. Virtually every voter needs to check, and check well.

12. There is a substantial amount of evidence in this case that voters in Georgia do not check BMD printout. Supplemental Declaration of Richard DeMillo dated 16 December 2019 (Document 680-1), at ¶22. Supplemental Declaration of Rhonda J. Martin dated 16 December 2019 (Document 680-1), at ¶13–14. Declaration of Elizabeth Throop dated 15 December 2019 (Document 680-1), at ¶30–33. Declaration of Aileen Nakamura dated 16 December 2019 (Document 680-1), at ¶33–40. Declaration of Marilyn Marks dated 20 August 2020 (Document 800-3), at ¶15. Declaration of Aileen Nakamura dated (Document 723) at 12. Declaration of Samantha Whitely dated 16 August 2020 (Document 800-6), at ¶25–26. Declaration of Harri Hursti dated 24 August 2020 (Document 809-3), at ¶7, 13, 19, 86. Declaration of Laurel Dowswell dated 17 August 2020 (Document 809-11) at ¶18. I understand that there are in-person observations covering seven elections between November 2019 and August 2020 in evidence in this case.

13. Dr. Adida testified that RLAs are meant to be an audit of the scanners and that RLAs check (only) the tabulation.[2] That is incorrect in more than one way, as I shall explain.

14. First, as I explained in my previous declaration, ballot-polling RLAs do not "check the tabulation." Rather, they check whether an accurate manual tabulation of the paper trail would find the same winner(s).

---

[2] He also said or implied that there is no inherent difference between checking the tabulation of hand-marked paper ballots and checking the tabulation of BMD printout. But there is.

15. In particular, ballot-polling audits, the kind of audit Georgia is considering, do not check whether the tabulators correctly tabulated any individual ballot or any group of ballots, including the entire set of cast ballots. A ballot-polling audit of a plurality election just checks whether the paper trail has more votes for the reported winner(s) than for any other candidate(s). The tabulators could misread every single vote and still find the correct winner; a ballot-polling audit would not detect this complete failure of the tabulation system. For this reason, it is incorrect to consider ballot-polling RLAs to be checks of the tabulation.

16. RLAs do not check whether the paper trail is trustworthy. They do not check whether BMDs functioned properly. They do not check chain of custody. They do not check a host of things related to physical security, eligibility determinations, signature verification, etc. It is the role of the compliance audit to establish whether the paper trail is trustworthy. As mentioned above, a compliance audit can establish whether hand-marked paper ballots are trustworthy, but no procedure can establish whether BMD printout is trustworthy.

17. Second, if the paper trail is trustworthy, then checking whether an accurate manual tally of the votes in the paper trail would find the same winner(s) the machines reported *checks the electoral outcome of the contest*. But checking whether an accurate manual tally of an untrustworthy paper trail would find the same winners the machines found does *not* check the electoral outcome. In particular, checking the tabulation of BMD output does not check the electoral outcome. Checking the tabulation of hand-marked paper ballots that were not kept secure does not check the electoral outcome, either.

18. Dr. Adida's analogy between auditing BMD printout and the strength of a door lock when a porch window is open is inapposite. A better analogy is that applying RLA procedures to untrustworthy paper records—including BMD printout and inadequately secured hand-marked paper ballots—is like checking an expense report where there are no original receipts, only hand-written expense records from the employee claiming reimbursement. Yes, faulty addition (the "open porch window") can make the reported expense total wrong, but unless the expenses are checked against reliable evidence of what was spent—the original receipts—correcting the addition does little to ensure that the claimed expenses are correct.

19. Even for hand-marked paper ballots, rules for securing the paper trail and demonstrating that it was kept secure are essential to election integrity. Absent secure physical custody, neither audits nor recounts of the paper trail can determine who really won, any more than checking an expense report with no original receipts can determine whether the report is true and correct. Audits or recounts of an untrustworthy paper record are "garbage in, garbage out."

20. Some of the largest errors I have seen in elections came from failing to scan a batch of ballots or scanning a batch twice. That has nothing to do with the accuracy of the tabulators or hacking: it is about human error and procedural failures. A properly conducted RLA of a trustworthy paper trail would (with high probability) catch such human errors if those errors changed the outcome of one or more contests in the election.

21. Dr. Adida opined that it would be too burdensome to conduct a risk-limiting audit of every contest, and in particular that the workload "explodes" for small contests. The limitation on the number and size of contests that can be audited efficiently is a limitation

of the Arlo software, not of RLAs. Arlo is more than eight years behind the state of the art. There are efficient RLA methods for auditing contests of all sizes. Arlo does not implement those methods. [3] The methods are well established in the literature; they have been implemented in open-source software freely available on GitHub; and they have been tested in San Francisco, Alaska, Wyoming, and Kansas.

22. The 2018 National Academies report, *Securing the Vote: Protecting American Democracy*, recommends conducting a risk-limiting audit of every state and federal contest, and of local contests "when feasible." NASEM (2018), at 9, 101. So does the Principles and Best Practices for Post-Election Tabulation Audits consensus document cited in my previous declaration (*Principles,* at 13).

23. Dr. Adida implies that only top-of-the-ticket contests matter. I doubt candidates in down-ballot contests would agree. Moreover, as I testified previously, even a rigorous audit of one contest says nothing about the accuracy of other contests. Misconfiguration and hacking can affect some contests but not others. There is no principled basis for auditing only one contest every other year.

24. Judge Totenberg asked Dr. Adida to explain how risk-limiting audits work. He said that RLAs compare the margin in a statistically representative sample of ballots to the margin

---

[3] Arlo is based on a method published in 2012 and does not completely implement that method. The method is a "lowest common denominator" method expressly designed to be simple and to demand little of the voting system, rather than to be efficient. There were more efficient auditing methods before 2012, and there have been many advances in RLAs in the last eight years. Arlo does not implement the most efficient methods for conducting RLAs, nor methods for auditing many kinds of contests, including super-majority contests. Arlo only supports "ballot-polling" audits, one of the least efficient methods. Arlo does not support the most efficient method, ballot-level comparison auditing. Arlo supports only one way of drawing a sample: unstratified random sampling of individual ballot cards, with replacement. Other sampling methods are more efficient and give jurisdictions more logistical flexibility.

reported by the tabulators. If the comparison shows there is something "fishy," the audit continues. If not, the audit stops.

25. Judge Totenberg asked Dr. Adida whether the approach he described suffers from "confirmation bias." It does. The procedure Dr. Adida described is not how risk-limiting audits work.

26. RLAs assume that the reported outcome is *wrong*, not that the reported outcome is *right.* They try to rule out the possibility that the reported winner(s) did not really win—not to "confirm" the reported tally. RLAs examine more and more ballots until either (a) the examined ballots give convincing evidence that the reported winners really won or (b) all the ballots have been manually inspected so the correct outcome is known. No form of RLA assumes that the reported results are correct nor that the margin is correct.

27. I shall sketch how a ballot-polling risk-limiting audit works. It starts with a paper trail of votes that has been established to be trustworthy by a compliance audit. It then requires a "ballot manifest," a detailed description of how that paper record is organized and stored, for instance, "there are 403,992 ballot cards[4] in all, stored in 1027 boxes. Box 1 contains 527 ballot cards. Box 2 contains 763 ballot cards. Etc." The ballot manifest should be created without reliance on the voting system, because the voting system could misreport the numbers; moreover, human error could cause the voting system to report the wrong number, for instance, if a box of ballots was not scanned. The reported winner really won if, in the full set of ballots, more ballot cards have votes for the reported winner than for any other candidate.

---

[4] I use the term "ballot card" rather than "ballot" because some ballots consist of more than one card (page). In general, the pages of a multi-card ballot do not stay together in the scanning and storage process.

28. Given the ballot manifest, a ballot-polling audit selects ballot cards at random from the ballot manifest, e.g., the 39th ballot in box 492, the 356th ballot in box 300, etc. The votes on those ballot cards are read by hand.

29. Some of the selected ballots might not have a valid vote in the contest; some might have votes for the reported winner; and some might have votes for other candidates.

30. In a small random sample of ballot cards, there can be a moderate chance that there will be substantially more votes for the reported winner than for any other candidate even if the outcome was a tie or the reported winner actually lost. But the larger the sample, the less likely it is that a candidate will have a substantial majority of votes in the sample if that candidate does not have more votes than other candidates in the full paper trail (i.e., if that candidate did not actually win).

31. A risk-limiting audit makes this precise: if there is a large enough majority for the reported winner in a large enough sample of ballots, it is implausible that anyone other than the reported winner actually won, because it would be extremely unlikely to see such a majority for the reported winner in the sample if anyone other than the reported winner had actually won. A risk-limiting audit with a risk limit of 5 percent examines ballots until the chance of observing so many votes for the reported winner is less than 5 percent if any other candidate had won—or until every ballot card has been manually inspected. The key property of a risk-limiting audit is that the chance it stops short of a full hand count is not greater than the risk limit (here, 5 percent) if that hand count would show that that someone other than the reported winner actually won.

32. On a personal note, while I am pleased that my invention has gotten traction, I am deeply troubled that risk-limiting audits are being used to whitewash poorly designed election

systems and insecure electoral practices. Risk-limiting audits of a trustworthy paper trail are a powerful and efficient tool to ensure that the reported winners really won. Risk-limiting audits of an untrustworthy paper trail are a distraction from fundamental problems in election integrity, not a cure. RLAs are not magic. They cannot limit the risk of certifying a wrong outcome without a trustworthy paper trail. BMD printout is not trustworthy because it is a record of what the computer did, not what the voter did; there is no test or audit that can make it trustworthy. It is that simple.

I declare under penalty of perjury, in accordance with 28 U.S.C. § 1746, that the foregoing is true and correct.

Executed on this date, 13 September 2020.

_____

Philip B. Stark