

**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**

SUPPLEMENTAL DECLARATION OF PHILIP B. STARK

PHILIP B. STARK hereby declares as follows:

1. This statement supplements my statement of September 9, 2018 regarding the need for post-election audits generally, and in Georgia specifically. I stand by everything in the previous declaration, but in light of the court's decision to allow the State of Georgia to conduct the November 2018 elections using its current equipment, I wish to add a few recommendations.
2. I understand that in the upcoming 6 November 2018 election, some voters will cast their votes using polling-place DRE machines. I understand that other voters will cast paper ballots that will be tabulated using Diebold Accu-Vote optical scanners.
3. There is no way to ensure that DREs correctly record and tabulate votes, because there is no voter-reviewed, durable, tamper-evident record of the votes cast on DREs, and it is possible to alter DRE software undetectably. Unless so few voters cast their votes using DREs that those votes cannot change the outcome of the contests under audit, there is no

way to audit election outcomes in Georgia that guarantees a high probability of detecting and correcting incorrect election outcomes (i.e., a *risk-limiting audit*).

4. Nonetheless, I recommend that a sample of DREs be audited forensically, both before the election (but after the DREs have been configured for the election) and after the election.

I recognize that there might not be time for a complete forensic examination of machines before contest results are certified, owing to the short canvass period in Georgia.

However, such an examination should be conducted as soon as possible after the election, to inform the conduct of future elections.

5. The forensic examination should be performed by appropriate independent security experts and/or suitably skilled law enforcement personnel. While such examination cannot be guaranteed to detect all tampering, bugs, or hacking, it could detect some kinds of problems and it could discourage malicious tampering.
6. The sample of machines inspected forensically after the election should include any machines for which the reported results are suspicious or anomalous, for instance, because they report more votes than the number of voters reflected in the pollbooks, or because they report a surprisingly large number of undervotes in one or more contests.
7. The samples should also include a number of randomly selected machines. The number of machines selected randomly for forensic auditing after the election should be large enough to ensure that if a material number of DREs used in the election had their software or firmware altered detectably, there is a large chance that the forensic audit will find at least one such machine. The number of machines that should be considered material depends in part on contest margins and the number of votes cast on each DRE. If the court orders the state to conduct such audits, I will gladly make myself available to

determine appropriate sample sizes, to draw the random sample, and to conduct other statistical calculations as needed.

8. I recommend that there be manual checks of the accuracy with which DRE results are reflected in the reported, aggregated contest results: every uploaded electronic tally from a DRE should be checked manually against the totals printed in the polling place when the polls close on election night. The DRE results should also be checked for obvious problems, such as reporting more votes than voters at a polling place.
9. I also recommend that the accuracy of the tabulation of the votes on paper ballots be checked by a post-election audit involving manually inspecting a random sample of ballots, as described below. Even though perfect tabulation of the votes cast on paper ballots cannot in general guarantee that contest outcomes are correct (because some votes are cast on DREs), auditing the accuracy of the tabulation of votes cast on paper ballots is valuable for many reasons, including as a deterrent.
10. I recommend auditing the tabulation of as many contests as practicable, giving priority to statewide and federal contests. The method of determining which contests to audit is not crucial, provided it is not possible for anyone to know which contests will not be audited before election results have been announced. Otherwise, a malicious actor could avoid any possibility of detection. An example of a reasonable rule would be to audit every statewide and federal contest, and a random sample of three within-county contests in each county.
11. I recommend recording voter intent for every contest represented on every ballot inspected by the audit, even contests that are not the deliberate target of the audit, and

making those data publicly available. Such data can provide additional information about the accuracy of the tabulation of other contests at negligible marginal cost.

12. For contests deliberately subject to audit, I suggest that the audit ensure with at least 95 percent confidence that the error (in votes) in the tabulation does not exceed the margin of the contest (in votes), times the percentage of ballots in the contest that were cast using paper ballots. In California law, this is called a “partial risk-limiting audit.”
13. Statistical methods and example software that could be used to perform such audits are given in Ottoboni, K., P.B. Stark, M. Lindeman, and N. McBurnett, 2018 (in press). Stratified Union-Intersection Tests of Elections (SUITE), *Electronic Voting. E-Vote-ID 2018*. Lecture Notes in Computer Science, Springer. Preprint: <https://arxiv.org/abs/1809.04235>, last visited 29 September 2018. If the court orders such post-election audits, I will gladly make myself available to help design and conduct the audit, including providing software to support the audits, and training for election officials.
14. If Georgia election officials undertake post-election auditing of paper ballots, I urge that they consult with non-profit organizations experienced in post-election risk-limiting audits to tailor existing procedures to Georgia’s circumstances quickly, inexpensively, and reliably. The procedures need to ensure that the paper records remain trustworthy, through measures such as ballot accounting, verified chain of custody, two-person access rules, and appropriate physical security and surveillance.
15. Post-election auditing has no impact on voters’ experience casting their votes nor on pollworkers’ duties at the polling places: the audit is conducted in the election officials’ offices after polls close, not at polling places.

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, September 30, 2018.



Philip B. Stark