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May 9, 2020

The Honorable Bill Quirk
State Capitol, Room 2163
Sacramento, CA 95814

Support for AB2400

Dear Assemblymember Quirk,

I have been asked to address some questions regarding AB2400.

1. Why are batch level comparison audits not included in AB 2400?

A batch-level comparison audit involves exporting vote subtotals for physically identifiable batches, then hand tallying the votes in those batches and comparing the two. California legacy voting systems cannot export of batch-level results in a useful format, so a great deal of handwork is required. In some cases, voting systems can only export batch-level results for precincts, but the physical ballots are not organized by precinct, so sorting all the cast ballots would be required—an substantial burden, even with automated sorting equipment.

Moreover, batch-level comparison audits are generally less efficient than both of the approaches included in AB2400: ballot-level comparison audits and ballot-polling audits. See pp.11-12 of *California Secretary of State Post-Election Risk-Limiting Audit Pilot Program 2011-2013 Final Report to the United States Election Assistance Commission*:

https://www.eac.gov/sites/default/files/eac_assets/1/28/AUDIT%20PILOT%20FINAL%20REPORT

AB44 ensures that newer voting systems certified for use in California support ballot-level comparison audits, the most efficient approach to conducting an RLA.

2. Why have cross-jurisdictional RLAs been removed from this bill?

To perform a RLA of a contest that crosses jurisdictional boundaries (e.g., a congressional contest that includes parts of more than one county, or a statewide contest) requires sampling from all the ballot cards cast in the contest. This is only possible if every jurisdiction in which ballots were cast in the contest is

willing to be involved in the RLA, and it requires coordination of the audit across those jurisdictions so that each jurisdiction knows when it can stop examining additional ballot cards. Currently, it seems unlikely that every California county will conduct RLAs under AB2125 or AB2400. Leaving the 1% PEMT in place for cross-jurisdictional contests ensures that those contests get a modicum of scrutiny.

3. Why pick RLAs over ballot images audits? What is the difference between the two?

As I wrote in my letter supporting AB2400, auditing election results using images cannot provide affirmative evidence that reported results are correct.¹ As explained by the 2018 National Academies of Science, Engineering, and Medicine report:²

Voter-verifiable paper ballots provide a simple form of such evidence provided that many voters have verified their ballots. The ability of each voter to verify that a paper ballot correctly records his or her choices, before the ballot is cast, means that the collection of cast paper ballots forms a body of evidence that is not subject to manipulation by faulty hardware or software. These cast paper ballots may be recounted after the election or may be selectively examined by hand in a post-election audit. **Such an evidence trail is generally preferred over electronic evidence like electronic cast-vote records or ballot images. Electronic evidence can be altered by compromised or faulty hardware or software.** (National Academies at 94, emphasis added)

The vulnerability of digital images of ballots is not merely theoretical: Bernhard et al.³ show that ballot images can be manipulated between “in flight” to alter votes.

As a result, audits that rely on images in lieu of the underlying paper might be able to uncover some kinds of problems, but they can never provide affirmative evidence that election outcomes are correct—precisely what risk-limiting audits

¹See, for example, Lindeman, M., R.L. Rivest, and P.B. Stark, 2013. Retabulations, Machine-Assisted Audits, and Election Verification <https://www.stat.berkeley.edu/~stark/Preprints/retabulation13.htm>, and Lindeman, M., R.L. Rivest, and P.B. Stark, 2013. Machine Retabulation is not Auditing, <https://www.stat.berkeley.edu/~stark/Preprints/retabNotAudit13.pdf>

²National Academies of Sciences, Engineering, and Medicine, 2018. *Securing the Vote: Protecting American Democracy*, The National Academies Press, <https://doi.org/10.17226/25120>

³Bernhard, M., K. Kandula, J. Wink, and J.A. Halderman, 2019. UnclearBallot: Automated Ballot Image Manipulation. *Proc. 4th International Joint Conference on Electronic Voting (E-Vote-ID '19)*.

do provide, if the paper trail is trustworthy.⁴

Sincerely,

A handwritten signature in black ink, appearing to read "Phil B Stark", written in a cursive style.

Philip B. Stark

⁴Establishing whether a voter-verified paper trail is trustworthy can be accomplished through demonstrably secure chain of custody and “compliance audits.” See, e.g., Appel, A.W. and P.B. Stark, 2020. Evidence-Based Elections: Create a Meaningful Paper Trail, Then Audit, Georgetown Law Technology Journal, in press. Preprint: <https://www.stat.berkeley.edu/~stark/Preprints/appelStark20.pdf>