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Ken Bennett
Arizona State Senator
1700 West Washington Street
Phoenix, AZ 85007

REF: M2012

kbennett@azleg.gov

Dear Senator Ken Bennett:

I want to first apologize for not adequately communicating with you. I have made a declaration that I will be doing a better job of communicating in general, and specifically in keeping you apprised of progress in our ability to provide ballot image audits (BIAs). Since I am the primary architect of our solution, I can get buried in the technical details rather than letting people know how well things are going.

Let me reassure you that I value the interactions I have had with you and hope we can collaborate.

Today, I will cover the following points:

1. **Not all ballot image audits are created equal** -- As you consider a pilot to allow the public to perform Ballot Image Audits (BIA) of various types, it is important to understand the differences in the various proposals.

2. **Transparent Data Released in Dallas** -- As you have been pushing for AZ to release data to the public, Dallas, TX has posted a release of data for the recent primary election that can serve as a model for how it can be and should be done.

3. **We want AuditEngine to be considered in AZ** -- We have recently completed a pilot audit in MD and have done many other audits on a public-oversight

basis. As you move forward with your ballot image audit pilot project, we want AuditEngine to be included in that project.

1. Not all Ballot Image Audits are created equal

Although I support the ability for the public to review the ballot images and cast vote records by hand, we have found that this is not sufficient to actually accomplish the comprehensive audits required to find issues in the election.

To clarify this point, we can consider a number of "classes" of BIA audits that can be conducted. I will be completing a more comprehensive article on this topic soon, but for now, I will give you a preview with regard to BIA audits.

AuditEngine is designed to accomplish Class 1 and Class 2 audits, which provide the highest level of assurance, including the fact that we do not rely on any barcodes or QR Codes, and still audit all ballots and all contests. The Class difference is only due to turn-around time. In Class 1, we can provide initial results within about 24 hours during the election (allowing for corrections to be made prior to certification), and Class 2 is just as thorough. However, Class 2 is designed to be conducted after all the data is released. We need election related information prior to the election to provide Class 1 service.

In contrast, there exists more ad-hoc reviews using manual viewing of ballots. Those would be Class 4 or 5. They are not worthless, but we have found that it is just not feasible to manually review all the ballots, whereas an audit system like AuditEngine has been able to find even just a few discrepant ballots.

For example, in Fulton County GA, we were the first to locate 5 ballots accidentally included from the neighboring DeKalb County, and AuditEngine also located 5 additional ballots from the Fulton County primary election that were somehow included in the general election scanning. The amazing thing was that the primary ballots were also inches longer and it would be easy to notice these unless perhaps they were scanned separately. The ballots from DeKalb were actually included in the results, even though the machine did not interpret the ballots correctly. Thus, we hope you will consider these higher quality audits in the upcoming pilot project you are considering.

Here is the current structure of the classes (we are continuing to discuss and refine these classes, and not everything we do is expressed in the description.)

BIA Class 1:
This class involves a full re-interpretation and vote count of all ballot images and all contests published by the auditing system prior to obtaining the Cast Vote Record

(CVR), with no use of barcodes or QR codes. A full ballot-level comparison with the CVR is then conducted. This requires the Cooperative Workflow, and it can produce initial results in about 24 hours after we obtain the images.

BIA Class 2:
Similar to Class 1, this class includes some metadata (excluding votes) from the CVR prior to the election. Then, after the full evaluation of the vote, it compares as in Class 1 with the CVR to provide a discrepancy report that includes all ballots and all contests. We generally have to use this class when we don't have cooperation with the district to get information early.

BIA Class 3:
Ballots are rescanned using a non-voting system scanner and compared by batch. This method has offsetting benefits and drawbacks: the benefit of detecting hazards related to images that do not match the paper, and the drawback of reduced diagnostic precision. Thus, it is ranked below methods with higher diagnostic precision. It also is a higher cost solution because it requires scanning of paper ballots. We generally don't recommend this approach, but we do offer rescanning batches of ballots to confirm the images are accurate.

BIA Class 4:
This class starts with the CVR and compares the results of images with the CVR, known as a CVR-based audit. This can be performed by hand, by reviewing the entries in the CVR and then clicking a link to view the ballot image to check it, or using vendor-provided tools, which are available from Dominion and Hart, for example.

BIA Class 5:
An Image Only audit, which does not use the CVR. This method can be used with Dominion images that include an "AuditMark," where staff or volunteers will review the ballot image and compare the human-eye interpretation of the vote with the AuditMark page. This can detect QR code errors, such as was recently the case in DeKalb County, GA (and where they since have made QR Codes illegal). Because we can also detect these errors and many others by comparing with the CVR, we don't offer this approach at this time.

AuditEngine offers Class 1 and Class 2 audits and includes numerous reconciliations of the images with official counts prior to the start of the audit. We believe that AuditEngine should be considered for your pilot program due to its comprehensive approach and ability to ensure election integrity. In addition, we also can provide the other types of audits, as we now have the ability to handle independent scanning, and our "AdjudiTally" app makes it easy to review discrepancies. Thus, any ballot can be reviewed and tallied using a structured approach.

Regarding Levels 4 and 5, we find that the vendors are now offering their own ballot review apps that should be included in your pilot review, as well as using our AdjudiTally app, if those are not available.

2. Transparent Data Released in Dallas

Secondly, I would like to highlight the excellent data transparency effort recently adopted by Dallas, TX. They have set a new higher precedent by posting all data related to their election, including ballot images, CVR, scans of all voting machine zero and post-election tapes, machine logs and audit logs, voter lists, and all public notices. The ballot images are redacted to eliminate any personal information. This comprehensive approach to data transparency not only enhances public trust but also reduces the need (and unpredictable costs) to fulfill random data requests.

Transparency is the key to public confidence in our elections, and I appreciate that you have been fighting to improve the transparency in AZ. This example can show how it can be done. The more we can standardize the format and contents of such releases the more useful and reassuring the information is to concerned parties.

Here is some information about this release from Dallas:

- **Press release** -- https://mailchi.mp/dallascounty/presser_openelectionrecords

- **Data** -- You may choose to ask for assistance to process this large amount of data. https://dallascountytx.sharepoint.com/sites/DC-Elections/Shared%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FDC%2DElections%2FShared%20Documents%2FHR%20and%20Records%2FRecords%20Coordination%2FELECTION%20SPECIFIC%20RECORDS%2F2024%2F1%20March%20Primary&p=true&ga=1&LOF=1

- **Contents** -- I summarized the contents of this data release in detail in the attachments, and we can say the large groups are the following:
    - All ballot images exported from the voting system (redacted) and CVRs
    - Ballot style masters (this is what we need for our fastest, or Class 1, BIAs)
    - Notices, equipment lists, allocations
    - Logic and accuracy test data
    - Scans of zero and results tapes for each machine
    - Voter turnout by location
    - Voter registration lists
    - Machine and audit logs
    - Post election manual recount and other recounts

- All the possible reports

I urge you to consider adopting a similar model in Arizona. Such proactive planning and data availability would significantly benefit public access and scrutiny, thereby strengthening the integrity and transparency of our electoral process.

Ballot Image Audits are the most powerful audits available, because they can be automated and applied to all elections. To do so will require additional standardization to avoid special cases and inconsistencies, particularly getting the names of contests to be consistent between reports and among different counties.

Of course, having a consistent data release format will help as well.

3. Please include AuditEngine in your BIA pilot project

I was able to show you our results when we entertained doing the audit of Maricopa County in the 2020 election. Unfortunately, we did not accomplish getting the contract to do the audit in that election. However, we are able to provide ballot image audits, and we have had the opportunity to further enhance our solution.

Recently, we conducted a pilot audit with the state of Maryland, specifically for the Rockville City municipal election. I have to say we were quite impressed with the consistency of their data as it allowed us to further enhance our mapping process so it now only requires inspection of a spreadsheet table, which compares the strings used on the ballots and those used in the CVR. We always use two different sets of proofs to allow us to check on the mapping before we run the audit. Maryland uses a top-down model where all counties use the same (ES&S) voting equipment and the SOS handles all machine configuration. As a result, they are quite sophisticated in their understanding of the issues that will make the audits run smoothly.

I can't help but mention that we recently worked with a number of groups in New Jersey to perform audits of Burlington, Mercer, Monmouth and later Hunterdon Counties. They asked me if the audit would find anything, and I told them I can't guarantee anything, but "generally we find a lot".

Indeed, we did detect repeated ballot images in Monmouth County. Thus, hand counts were conducted and one contest was overturned. We were able to find the exact ballot images that were accidentally included twice, when six thumb drives were uploaded twice. We also found other contests that were not hand counted but should have been.

We found issues in Mercer County, as they had huge problems when they introduced new voting machines and had the styles configured incorrectly. What is good in that

state is they moved to paper-based voting systems instead of purely DRE machines with no audit trail, and some pains of transition are to be expected. However, in that case, they had the voting system vendor configuring the machines and the errors were inexcusable.

We summarized a number of findings that we have encountered in the elections we have been able to audit, and I am including that document with this letter. My understanding is that none of the other groups or auditing methods have found anything useful.

AuditEngine Findings:
https://docs.google.com/document/d/1uraII_fTsaPdUbTaidmBTwsCSdiRk31oAVzm-eUC_SA/edit?usp=sharing

Currently, I am preparing several new documents discussing how to evaluate various auditing methods and how to correctly determine if auditing methods themselves can be audited and checked by the public. Far too often, experts conduct audits that are difficult to understand and then emerge and announce that "everything checks out" while the public understands nothing, and those audits can't be checked themselves. In these cases, the audits do nothing to improve confidence.

Our audits do use software, but we can show the progression of the data from images to our results and how we process the CVR to perform our comparison and create reports. We believe we turn a black box into a transparent box.

I hope this information is helpful. Please call me at any time if you have any questions or would like to chat about your pilot project, and how we can get involved.

Sincerely,

Ray Lutz
Executive Director, CitizensOversight

ATTACHMENTS

Contents of Dallas County, TX election data release

The contents are summarized in the file "Archive Structure checklist 20240504.docm". That document is further summarized below.

- **1. Pre-election -- (These are notices and lists)**
  - List of Early Voting & Election Day Vote Centers
  - Notice of Equipment Testing
  - Public Notice of Test of Automatic Tabulating Equipment
  - Notice for Signature Verification Committee
  - Notice for Early Voting Ballot Board

- **2. Election setup**
  - Allocations -- Staff & Equipment Allocations_2024-03-05 -- Spreadsheet with the allocations of equipment and personnel for the election.
  - Public test -- 20240305_L&A Tests (Summary) -- Single PDF file containing all the documentation generated during the public test.
  - Sample ballots -- PDF files of individual precinct ballot styles -- Files used to feed the voter lookup website for voters to download as sample ballots. There should be one file per ballot style.

- **3. Absentee**
  - Mail-Ballot-Returns-Report -- Report – EV Mail Ballots Returned

- **4. Early Voting**
  - Results Tapes -- Scan of the results tapes produced by the voting machines, signed by the election judge.
  - EV Daily Reports
  - EV Ballot and Seal
  - Zero Tapes -- Scan of the zero-tapes produced by the voting machines.
  - Early-Voting-Turnout-by-Date-Location-Party
  - In-Person-Early-Voting-Report_03.01.24

- **5. Election Day**
  - Results tapes -- Scan of the results tapes produced by the voting machines, signed by the central-count judge.
  - VC Documents --
    - Ballot Card Chain of Custody
    - Poll Watcher Certificate of Appointment

        - Ballot and seal certificates
    - Zero Tapes -- Scan of the zero-tapes produced by the voting machines.
    - Roster -- Election-Day-Website-Roster_20240305
    - Voter-Turnout-byLocation_030524-1

- **6. Canvass**
    - Ballot Images (PDF format exported from ES&S system, grouped by precinct).
    - Democratic Party Canvass / Republican Party Canvass (separate folders including the following:
        - Overall detail of ballots cast in this election
        - Summary of ballots cast on election day
        - Canvass results detail for early voting and election day
        - Summary of voting results annotated by county precinct
        - Summary of EV ballots cast by mail annotated by precinct
        - Canvass results summary for early voting and election day
        - Election results summary
    - Logs and CVRs
        - Audit Logs -- (searchable) PDF files with the audit logs exported from the voting system.
        - Cast Vote Records -- xlsx Spreadsheet(s) containing the CVRs exported from the voting system
        - Machine Logs -- PDF files with the machine logs exported from the voting system. One file for EV machines and one for ED machines.
    - Reports
        - Preliminary Reconciliation Report -- Scanned copy of the signed preliminary reconciliation report issued by the Central Count Station Judge on election night.
        - Final Reconciliation Report -- Scanned copy of the signed final reconciliation report issued by the Central Count Station Judge for canvass purposes.
        - Official List of Registered Voters -- A list of Dallas County Registered Voters for this election.
    - Results
        - Canvass Reports -- All results report generated for canvassing.

- **7. Post-Election**
    - PMR tally sheets -- Scanned copies of the tally sheets used in Post-election Manual Recount

- Recounts -- One folder per recount, named with the Contest or Proposition being recounted. -- Pertinent reports and documentation related to any Dallas County managed recounts.