



PIMA COUNTY ELECTION INTEGRITY COMMISSION
MEETING MINUTES FOR FEBRUARY 17, 2017
<http://www.pima.gov/commission/ElectionIntegrity.shtml>

The Pima County Election Integrity Commission met in regular session on February 17, 2017 at 9:00 a.m. in the Herbert K. Abrams Building, 3rd Floor Conference Rooms 3108/3110 at 3950 S. Country Club Road, Tucson, Arizona.

ITEM 1. ROLL CALL

Present: Karen Schutte, Bill Beard, Mary DeCamp, Brian Bickel, Barbara Tellman, Brad Nelson, Chris Cole, Ken Moyes and Tom Ryan.

Also in Attendance: Nicole Fyffe, County Administrator's Office; Tom Quigley and David Wisely, Pima County Elections Department.

Absent: Jeff Rogers, Arnie Urken.

ITEM 2. PLEDGE OF ALLEGIANCE

The American flag was saluted with the Pledge of Allegiance.

ITEM 3. APPROVAL OF MINUTE SUMMARY – December 16, 2016

It was moved by Brian Bickel, seconded by Chris Cole and carried unanimously to approve the Minutes of the December 16, 2016 meeting.

ITEM 4. CALL TO PUBLIC

Benny White addressed a number of issues about a risk limiting audit, and distribution of ballot images.

ITEM 5. ELECTION OF EIC OFFICERS

NOMINATIONS FOR CHAIR:

Barbara Tellman nominated Karen Schutte for Chair, Ken Moyes seconded. Mary DeCamp nominated Tom Ryan for Chair, Chris Cole seconded.

VOTE:

For Karen Schutte: Chris Cole, Ken Moyes, Karen Schutte, Bill Beard and Barbara Tellman.

For Tom Ryan: Tom Ryan and Mary DeCamp.

NOMINATIONS FOR VICE-CHAIR

Karen Schutte nominated Barbara Tellman for Vice-Chair, Ken Moyes seconded. Tom Ryan nominated Brian Bickel for Vice-Chair, Chris Cole seconded. Mary DeCamp nominated Tom Ryan; it was decided that seconds are not needed for nominations.

VOTE:

For Barbara Tellman: Ken Moyes, Karen Schutte, Bill Beard and Barbara Tellman.

For Brian Bickel: Chris Cole, Tom Ryan and Brian Bickel

For Tom Ryan: Mary DeCamp. Tom withdrew his nomination.

SECOND VOTE:

For Barbara Tellman: Ken Moyes, Karen Schutte, Bill Beard and Barbara Tellman.

For Brian Bickel: Chris Cole, Tom Ryan, Brian Bickel and Mary DeCamp. Brian withdrew his nomination.

ITEM 6. RISK LIMITING AUDIT RECAP

Being new to the Commission, Ken Moyes asked what the driving force is behind doing the Risk Limiting Audit (RLA). Tom Ryan gave his abridged version: his opinion is that the hand count audits currently being done are inadequate. The RLA is one of the few methods he has seen come out of the statistical community with a rigorous mathematical basis for determining whether an election outcome is validated or not. It gives a technique for sampling ballots especially if the outcome is reported incorrectly and leads to correction of that outcome, whereas the hand count audit does not.

Karen asked for comments from EIC members on their perception of the RLA process:

Chris Cole:

It might be useful if one race is challenged. Not enough is gained to compensate for the time and effort required to conduct an RLA.

Bill Beard:

Public perception; you will never convince a majority of the public that reducing the number of ballots that need to be audited is a good idea.

The machines do not have the ability to correctly determine over- and under-votes.

Brian Bickel:

In a 400,000 ballot election, he can foresee spending several days doing the actual audit. Do the benefits of the RLA outweigh the resources required to make it happen?

Application of multiple serial numbers when the ballot is run multiple times and ensuring that serial numbers are not printed over one another. Approximately 20% of ballots needed to be rerun.

Too many variables handling ballots and the various boxes.

Barbara Tellman:

This was not an accurate test of what would really happen in a real election. This would not be feasible in an election with 400,000 voters. There are too many different locations where ballots are stored—for write-in ballots, duplicate ballots, etc. The current method is adequate and always comes out nearly perfect; the L & A test always comes out perfect, and any time there is a recount it comes out within a very small margin of error.

Karen Schutte:

Not only was pulling ballots cumbersome from all the boxes, but putting the ballots back where they belonged took even longer.

It is her understanding that in Colorado, it is staff who will conduct the RLA; the perception of eliminating the public's involvement in the audit process mitigates the progress Arizona has made with the Hand Count Audit that involves the public.

Brad Nelson:

Logistics involved; there is no way to plan anything until the first report is run.

As cumbersome as this mock process was, it used 11" ballots, one-sided printing, no folds. A General Election ballot would be 19" printed on both sides, folds, stains and other voter errors.

Mary DeCamp:

Mary agrees that the handling of ballots is cumbersome. She would like to see a system where it was all available online—the image of the ballot and the image of the cast vote record—where it would be transparent and accountable. We could eliminate all of the hands-on audits and allow public involvement.

Ken Moyes:

If the Hand Count Audit isn't broken, don't fix it!

Tom Ryan:

Tom put together a list of "pros" and "cons" [a copy of this list is incorporated into these Minutes as Attachment 1].

The process is cumbersome, but if RLA is required, procedures would be developed to minimize the "hassle."

Tom's objection to this process is it only works for elections contained in Pima County. The process cannot be applied in elections that cross county lines unless you have buy-in from the whole state.

What he does like is it is the only way you get a comparison between the physical ballot and how the system read it.

Karen liked the idea of comparing the ballot image to the paper ballot and wonders if this can be used in the hand count. An actual batch of images could be compared to the paper ballots; she asked Brad if he had ever considered that. Brad believes there may be some legislation that might allow something like that; a jurisdiction may use images for internal auditing prior to the canvass.

Tom Ryan suggests that there be a comparison of a random batch of say 200 ballots, and compare them with the machine's interpretation of those ballots, as an added sanity check in conjunction with the hand count audit. Karen would like to request the Elections Department to look into implementing this as part of the hand count audit. Brad will report the findings in the next meeting.

Brian Bickel suggested that as a compromise for elections with countywide races, for every box of ballots run through the machine, two ballots from each box could be removed, set aside for an RLA and compared to the ballot images. How to tie them together with the serial numbers and cast vote record would need to be determined.

Tom commented on Brian's mention of 20% of ballots needing to be rescanned. From an engineering standpoint, he would be upset with ES&S, and the Elections Department should be complaining to them about the performance of their system. Brad responded that yes, there are deficiencies with the system, but it is the best on the market.

Tom would also like to sort the early ballot images by precinct so that they can view a precinct's worth of early ballots along with the polling place ballots for that precinct, to compare against the canvass.

Karen made reference to a memo from Mr. Huckelberry concerning the RLA [a copy of this memo is incorporated into these Minutes as Attachment 2]. Included in this memo is information on voter fraud; Karen requested everyone to review this for inclusion on next month's Agenda.

ITEM 7. HANDLING OF OVERVOTES – EARLY vs. PRECINCT-CAST BALLOTS – Tom Ryan

Tom first noticed this issue when he was analyzing data from the cast vote records. If over-votes occur in early ballots, those ballots get "kicked" to a special out-put bin for review by a panel. They decide if there is an actual over-vote or other voter error. If it needs to be duplicated, it goes to the Duplication Board; if it needs to be run again, it is rescanned. What this indicates is that early ballots that are over-voted are looked at, but there are no such checks of ballots over-voted at the precinct, now that there are no scanners in the precincts. This inconsistency is a problem; all ballots should be treated the same way.

Bill Beard asked what the *Procedures Manual* says about this; Brad read from the section in the *Procedures Manual* that addresses the procedures for early ballot duplication [a copy of page 177 of the *State of Arizona Elections Procedures Manual* is incorporated into these Minutes as Attachment 3; see highlighted portion]. This subject is also covered by HAVA and called "second chance voting" when a voter puts their ballot into an optical scanner and it gets kicked out. In the case where all ballots come back to a central count environment, there needs to be a plan approved by the Secretary of State or appropriate officer to educate voters to the fact that they have the opportunity to get a second ballot. In Pima County, there is a big sign in every voting booth that tells voters that if they make a mistake on their ballot, they can return it to the poll workers and get a new ballot, for up to three times. This information is also printed on the secrecy sleeves, the sample ballot they receive in the mail, and a notice is printed on the top of the ballot about not over-voting the ballot.

Bill Beard said that the EIC should restate its position about putting scanners in the precinct.

MOTION:

Tom made a motion to send a recommendation to the Board of Supervisors to change the procedure to treat precinct-cast ballots the same as early ballots.

DISCUSSION:

Tom noted that the procedure stated in the *Procedures Manual* [see highlighted portion of Attachment 3] mentions precinct scanners, which Pima County no longer has, so this procedure does not apply. Bill Beard offered a friendly amendment that the problem would be solved if precinct scanners are included. Tom said that is one option.

Barbara said she doesn't believe the Board of Supervisors has the authority to change the procedure. Ken suggested a formal request from Pima County to the Secretary of State to have the issue in the *Procedures Manual* reviewed, since other central count counties would have the same problem; Bill reminded the Commission that it advises the Board of Supervisors.

MOTION RESTATED:

Tom restated the motion: We recommend to the Board of Supervisors that the County policy for handling precinct-cast ballots with respect to over-votes be modified so that it is consistent with how early ballots are handled. As an option, one solution to the problem is to put scanners back in the precincts. State clearly in the recommendation what the *Procedures Manual* says.

Brad noted that this procedure, which complies with HAVA, was approved by the Secretary of State under Ken Bennett's administration.

Tom was asked again to restate the motion. Tom's proposed motion is to send a recommendation to the Board of Supervisors, explaining what the problem is with respect to over-voted precinct-cast ballots and the fact that they are not treated the same as early ballots. We recommend that either the County change the policy and require that the Elections Department process those ballots in the same way they process early ballots, or if the *Procedures Manual* prevents that, they approach the Secretary of State for a fix.

VOTE:

Brian seconded the motion as restated; the motion was passed with 7 ayes, and Barbara Tellman casting a no vote.

Barbara suggested that this needs to be handled in the *Procedures Manual*, and the Commission should focus on that in the coming months and really pay attention to revisions to the *Manual*.

Bill reminded the Commission that this body voted unanimously to recommend when equipment was being purchased that precinct scanners be a part of that process.

ITEM 8. TRACKING LEGISLATION – Bill Beard

Bill Beard provided a copy of the election-related bills in the Arizona Legislature [a copy of these bills is incorporated into these Minutes as Attachment 4]. Bill will be updating the list of legislation and the status of each bill throughout the legislative session.

Nicole Fyffe asked if the list of legislation is typically this long; Bill and Brad responded yes, and it will get longer with additional bills and strikers.

Barbara noted that anyone can comment on all legislation and actually testify in committee from your own home; Bill concurred and said the website address is shown at the end of the list [page 5 of Attachment 4]. Once you have registered in the system, you can speak up on any piece of legislation at any time. Barbara clarified that you establish an account with a password at the state office either here or at the Legislature or through your legislative representative and then make a request to speak.

ITEM 9. 2017 RECOMMENDED LEGISLATIVE CHANGES – Tom Ryan

The suggestions for legislative changes were compiled by the subcommittee comprised of Jeff Rogers, Barbara Tellman, Bill Beard and Tom Ryan [a copy of the draft is incorporated into these Minutes as Attachment 5].

Bill explained that the subcommittee used a document published by the Secretary of State with their suggested legislative changes as a starting point for the subcommittee's recommendations. Bill thinks this list is fairly balanced between left and right. The list will eventually be forwarded to the Board of Supervisors for their lobbyist to consider. Although it is too late to get these recommendations in for this legislative session, Tom Ryan believes that a list that everyone on the Commission agrees on should be submitted in time for next session.

Barbara said that the subcommittee has agreed that the focus should be not so much on changes to legislation, but to the *Procedures Manual*. Many of the items on the list address things in the *Procedures Manual*.

Brad told the EIC that Secretary Reagan has informed county election officials and recorders that she wants their input on the *Procedures Manual*, and has said that it will be a revision rather than a complete re-write as alluded to by Eric Spencer in December. The proposed first meeting with county recorders and Secretary of State personnel is scheduled for on or about May 6, 2017. Brad is doubtful that a new *Procedures Manual* will be ready in June, as Karen Schutte had heard.

Ken referenced item 2 on the list for eliminating the names of presidential electors from the ballot; when you vote for president, you are actually voting for the electors, not the president. This has been the practice since 1789. Brad pointed out that those presidential electors' names take up a lot of room on the ballot. The information could be included in the publicity pamphlet, sample ballot, and posted at the polling place.

Brian proposed that this be a standing Agenda item, and Tom suggested tackling three or four items at each meeting.

ITEM 10. BALLOT CHAIN OF CUSTODY – Ken Moyes

On Election Night, Ken was an observer at the Receiving Station in Rita Ranch. He prefaced by saying that the operation as a whole is extremely good. He just had some observations that he wanted to present:

- Broken seal on ballot box from one precinct.
- Seal not latched on ballot box from one precinct.
- Ballots brought in from one precinct without the paper work; poll workers were sent back to get the paperwork and they never returned; Sheriff's Deputy had to go find them and retrieve the ballot box and paperwork.
- Poll workers and Receiving Station personnel did not display party affiliation ID.

Brad responded that deficiencies are documented on Chain of Custody paperwork, including any explanations and persons responsible. All poll workers sign the forms attesting to the information. Report cards are sent to each poll worker at each precinct citing any deficiencies so they can be corrected. And poll workers who are prone to error do not get invited back.

ITEM 11. UPDATE ON BALLOT IMAGE LAWSUIT & PUBLIC RECORDS REQUEST – Brad Nelson

On March 13, 2017 there will be a hearing on the County's Motion to Dismiss. Other than that, there is nothing new.

ITEM 12. FUTURE AGENDA ITEMS

Items 1 through 4 on the current list of EIC recommended legislative changes.
Update on changes to Procedures Manual.
Elections Department audit of small batches of ballots to images.
2016 Annual Report.
Review of Mr. Huckelberry's memo on election fraud.

ITEM 13. NEXT MEETING DATES

March 17, 2017

ITEM 13. ADJOURNMENT

It was moved by Bill Beard, seconded by Ken Moyes, and unanimously carried to adjourn the meeting. The meeting adjourned at approximately 11:15.

Evaluation of Risk-Limiting Audits

Pros:

- 1) Statistically rigorous auditing method that limits to specified acceptable levels the risk of certifying an incorrect election outcome.
- 2) Different RLA methods apply depending on election system capabilities (ballot comparison vs. batch comparison vs. ballot polling methods).
- 3) Pima County is able to use the ballot comparison method that uses relatively small number of ballots to validate outcomes of most races.
- 4) Method extends naturally to multi-district and statewide contests with jurisdictions sharing the auditing burden in proportion to ballot count.
- 5) The larger the margin, the smaller the number of ballots needed to confirm outcomes. Limited resources are focused on close races. Most contests require small sample sizes.
- 6) The RLA audit compliments the "performance audits" (hand counts) currently done in some AZ counties. If RLA is implemented, perhaps the hand count could be scaled back.
- 7) If discrepancies are found, the ballot comparison RLA adds some diagnostic utility through the comparison of ballots to election system interpretations. The hand count has no such diagnostic utility.
- 8) Any subset of races can be audited. Different risk-limits could apply to different races (relative importance?).
- 9) Audit could be done using ballot images if images are available and accepted as accurate representations of the physical ballots. This would eliminate need to access physical ballots by serial number and would therefore be far more efficient.

Cons:

- 1) Extremely small margins can require inconveniently large sample sizes.
- 2) Cannot validate county level outcomes if contests extend beyond county boundary (margins within county may not represent actual contest margins).
- 3) Multi-county (including statewide) contests require coordination among counties for ballot sampling and audit termination decisions.
- 4) Efficient uniform sampling strategy is less obvious if multiple audited races have significantly different sample sizes, district boundaries, or ballot counts. The default is to audit each race separately but combine races where clearly appropriate.
- 5) The comparison method requires imprinting a serial number on each physical ballot (unless images are used). Operators need to rotate or flip ballots to avoid serial number overprinting on ballots needing multiple scans. Some serial numbers will be overprinted.
- 6) Added concern if printed serial numbers interfere with ballot timing marks (although this did not seem to cause problems in the mock election despite obvious interference).
- 7) All methods require retrieval of physical ballots from storage boxes (unless images are used). Depending on sample size, it's possible that a large fraction of ballot storage boxes will need to be opened. Write-in ballots (~10% of ballots) are harder to retrieve if serial number sequencing is not maintained.
- 8) Storage boxes must be labeled with ranges of ballot serial numbers and preparation for the RLA requires creation of a ballot manifest to simplify the retrieval of physical ballots.



MEMORANDUM

Date: February 6, 2017

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckabee
County Administrator

Re: Elections Integrity Commission and Mock Risk Limiting Audit

On Wednesday, January 25, the Pima County Elections Integrity Commission (EIC) met and conducted a mock Risk Limiting Audit (RLA) using 30,000 ballots prepared for such an effort. An RLA attempts to ensure the validity of election results by reviewing a statistically valid random sample of the ballots cast and the votes reflected on those ballots. The closer the race, the larger the sample of ballots that would need to be reviewed as part of the RLA to validate the election results. Last year, the EIC had expressed interest in conducting an RLA to determine the merits of such. Pima County Elections Director Brad Nelson and his staff worked closely with EIC members to enable the EIC to conduct such an audit on a mock election. Ballots were printed with six ballot questions related to the Oscars (best picture, best actor, etc.) The votes were tabulated and the RLA included the use of a website created by the inventor of the RLA, Dr. Stark of UC Berkeley, to calculate how many of the ballots should be selected for audit based largely on the closeness of the closest race and the total votes cast. Attached are the instructions the EIC used for this RLA.

The EIC will meet next on February 17 and members will likely discuss their opinions of the RLA at that time. Mr. Nelson's initial impression after the exercise was that it was well worth the time, but that it may be too complex and time consuming to pursue further. I will certainly communicate to the Board the EIC's conclusions regarding the RLA after their February meeting.

Since 2008, Pima County has been implementing a hand count audit of twice as many ballots than required to be hand counted by state law. This typically occurs the Saturday after an election and involves designees of the registered parties. It is one of numerous elections security and transparency measures implemented by Pima County since 2008.

It is somewhat ironic that the same day the EIC conducted this mock election audit, President Trump announced he would be "asking" for a major investigation into voter fraud, including those registered to vote in two states, those who are illegal and even, those registered to vote who are dead (and many for a long time). This followed his unsubstantiated claims that 3 to 5 million people voted illegally. While ensuring accurate election tabulation results is separate from ensuring against voter fraud, our democracy relies upon the public's confidence in the integrity of the entire elections system from start to end.

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Arizona Secretary of State Michele Reagan and Pima County Elections Director Brad Nelson, where both interviewed on Wednesday by Arizona Public Media about these allegations, and responded confidently about Arizona and Pima County's protections against voter fraud. Chris Roads, Chief Deputy Pima County Recorder and Registrar of Voters, provided the following details concerning the President's allegations:

1. Regarding "those registered to vote in two states," the Pima County Recorder's office regularly compares the voter registration file to the United States Postal Service National Change of Address database, at a minimum of twice each year, in order to keep the voter rolls current. Most of the Pima County database was checked six different times between October 2015 and November 2016 due to the five countywide elections and the mass mailing of identification cards that occurred during that time. Voters identified as having moved are blocked from receiving early ballots until they update their registration record or contact the Recorders Office to confirm an error with the postal system.

For several years, the State of Arizona has participated in a comparison of the Arizona voter registration database with the voter registration databases of a majority of other states. Any person identified as possibly being registered in more than one state is flagged. Both states investigate to determine if it really is the same person and which state should keep the record active. The record in the other state is then cancelled. Persons identified as having voted in two states during the same election are referred to both states' Attorney General's Offices to determine whether criminal charges should be filed. This record check generally occurs during the spring of an odd numbered year after a federal election. The last check resulted in several thousand "false positive" matches who turned out to be two different people with the same name.

2. Regarding "those who are illegal," the Pima County Recorder's Office confirms proof of citizenship in a number of ways depending on the method by which the individual registers to vote. Often the proof of citizenship provided is a driver's license number, which is confirmed by comparing the data to Motor Vehicle Department records.
3. Regarding "those registered to vote who are dead," the Pima County Recorder's Office is informed of a voter's death through multiple sources including newspaper obituaries, the Arizona Department of Health Services, recorded documents and contact with family members. Registrations are cancelled immediately upon receiving reliable information of a person's death. In Pima County, there has been only one incident of a person attempting to cast a ballot for a deceased relative in the past 10 years. That vote was cast by early ballot. The issue was identified during the regular

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signature verification process (the signature on the early ballot affidavit was invalidated during the signature comparison process) and the Pima County Attorney's Office investigated the incident.

4. Finally, although not mentioned specifically by the President, there are instances where a voter may vote by early ballot and then attempt to vote a second time at the polls on Election Day. At that point, the early ballot has usually already been counted. According to state law, any voter who receives an early ballot is required to vote only by provisional ballot at the polls on Election Day. The provisional ballots are sent to the Pima County Recorder's Office to determine validity immediately after Election Day. Any provisional ballots that were cast by people who had already voted by early ballot are disqualified and sent to the County Attorney's Office for investigation. Approximately half of those are submitted by elderly voters who, according to historical investigation information, "forgot" that they voted by early ballot. Others have been either inexperienced voters who were unaware that the early ballot was an actual ballot, or were reported to have been misinformed of the process by poll workers. To date, the County Attorney's office has not filed criminal charges in these instances as the system correctly blocked the second ballot from being counted. The review for the 2016 election is still in process and will not be resolved for several months, as each voter must be contacted directly as part of the investigation.

CHH/dr

Attachment

- c: The Honorable F. Ann Rodriguez, Pima County Recorder
Brad Nelson, Director, Elections Department
Chris Roads, Chief Deputy Recorder, Pima County Recorder's Office
Nicole Fyffe, Executive Assistant to the County Administrator
Pima County Elections Integrity Commission

Step-by-Step Instructions for a Risk Limiting Audit Using the Ballot Comparison Method

Introduction

The Risk Limiting Audit (RLA) involves comparing the interpretation of ballots by the voting system to human interpretations of the same ballots. Differences between the two interpretations are noted. Determining whether the audit can stop depends on the number and nature of those differences, the number of ballots examined so far, the risk limit, and the vote margin; the smaller the risk limit or the smaller the margin, the larger the number of ballots that must be audited.

The comparison of interpretations can be neutral, an *understatement*, or an *overstatement*, depending on the effect of changing the voting system interpretation of the ballot to match the hand interpretation. Consider the pairwise margin between each winner and each loser in a contest. For instance, a city council election might involve voting for three candidates from a pool of ten, to fill three seats on the council. Each of the three winners can be paired with each of the seven losers, giving twenty-one pairwise margins in that contest. If changing the interpretation of a ballot according to the voting system to make it match the human interpretation of the ballot would widen every pairwise margin in every contest under audit, that ballot has an *understatement*. Understatements do not call the outcome into question. If changing the interpretation according to the voting system to match the human interpretation would narrow any pairwise margin in any contest under audit, the ballot has an *overstatement*. If enough ballots have overstatements, the outcome could be wrong.

Efficient RLAs generally perform ballot interpretation comparisons until there is convincing evidence that the outcome according to a full hand count would agree with the outcome under audit. If convincing evidence is not forthcoming, the audit progresses to a full hand count, which is used to correct the outcome under audit if the two disagree.

Because the mock election will use previously prepared ballots, the exercise will not accurately mimic a real election in all ways. For example, the prepared ballots have no write-ins or overvotes and write-ins can't be added because any such modification will create overvotes that are treated differently than real write-in ballots. The only write-ins that might occur will be from the 300 ballots filled out by EIC members. While overvotes could be added to the mock election ballots, they would not have any effect on the election or RLA because they would just need to be rescanned and assigned new sequential ID numbers.

As this mock election RLA is a pilot study, we do not need to conduct a full audit for all contests. We can select any sample size, but the objective is to obtain an estimate of the time and resources involved in conducting RLAs for larger more realistic elections.

For this mock election, we will begin by conducting a Logic and Accuracy (L&A) test that will consist of about 300 ballots filled out by EIC members. Each member will provide a spreadsheet report of the vote totals in their ballot set. These will be combined to obtain expected tallies for

the full 300 ballot set. These 300 ballots will be added to the general population of 29,699 mock election ballots.

Step-by-Step Scanning and RLA Instructions

1. Scan ballots and track ballot storage locations. Scan ballots in batches, imprinting a unique serial number on each ballot. Keep ballots in the order in which they were scanned and create labeled stacks or boxes of scanned ballots with labeling designed so that individual ballots selected during the audit can be retrieved efficiently. If ballots need to be rescanned for any reason, take precautions to rotate the ballot so that the new serial number is not printed on top of an older one. Create a "ballot manifest" that lists how scanned ballots are organized (labeling of stacks, listing the number of ballots in each stack – see Step 7). Write-in ballots must be tracked separately from the general population. Conduct quality control measures to ensure that each stack of ballots contains the number of ballots listed in the manifest. During the audit, ballots will be randomly selected from the ballot manifest. Reconcile the ballot manifest against other accountings of the number of ballots and against poll books to the extent possible. Resolve any discrepancies before the audit begins.

2. Create a Statement of Votes Cast (SOVC) or other report or canvass with final vote tallies for each contest.

3. Create a list of Cast Vote Records (CVRs), a spreadsheet in which each record specifies how an individual physical ballot was interpreted by the tabulation system. Each record must include the CVR number and the ballot serial number. The audit will compare a sample of physical ballots with the CVRs that correspond to those ballots. The serial numbers on the physical ballots will be used to identify the corresponding CVR.

4. Validate the CVRs. Use a program to read the CVRs and tabulate the votes in all the contests contained therein. The results of this process should yield final tallies that are identical to those shown in the SOVC. If they are not, the CVRs and/or the SOVC are inaccurate. However, if the ballot manifest and the CVRs agree on the total number of ballots in each contest, and agree on the winners of each contest, the audit can proceed. In that case, the margin that should be used in the computation below is the margin according to the re-tabulation of the CVRs, rather than according to the SOVC.

5. Determine the contests to be audited. The contests to be audited may be determined by state or local laws or they may be selected randomly by agreement among local observers, political parties and election officials. If most of the contests are on the ballots of most precincts in the jurisdiction, there is not much time penalty to pay in auditing all the contests simultaneously. If however, a specific contest involves only a small part of the jurisdiction, it may be more efficient to audit that contest separately.

6. Determine the size of the initial audit sample. The initial sample size depends on the "diluted margin" which is the margin of victory in votes divided by the total number of ballots cast in each contest to be audited (not the number of valid votes in a contest). Dividing by the

number of ballots accounts for the possibility of confusing undervotes or overvotes for a valid vote, or vice versa. Go to the [Post-Election Audit Tools Website](#) and follow the instructions to enter contest data. The elections official may instead develop software tools based on the audit model (See Appendix). For purposes of the pilot program, the risk limit setting should be left at 10%.

Illustration: For zero expected over/understatements, the math is simple. The number 4.8 divided by the diluted margin provides the initial sample size for a 10% risk limit:

Diluted Margin	Equation	Initial Sample Size
50%	4.8/.5	10
30%	4.8/.3	16
10%	4.8/.1	48
2%	4.8/.02	240

7. Randomly select ballots for the sample:

1. Ask public observers to roll ten to twenty 10-sided dice to generate a “seed” number for a public-source pseudo-random number generator.
2. Enter the seed on the “Random Sampling” section of the [Audit Tools Website](#).
3. Enter the number of ballots in the contest(s) to be audited.
4. Click “draw sample” to select ballots.
5. Each random number corresponds to one ballot. For the mock election RLA the audit tools website can be used to randomly select CVR numbers. Each CVR number corresponds to a unique serial number. The serial numbers should be sorted to identify the set of serial numbers in each box of ballots so that ballot boxes are only visited once.
6. For each serial number, check the CVR to see if the ballot is a write-in, in which case the search for the specific ballot can be limited to the separated write-in subset.
7. Given the selected serial numbers, the ballots are retrieved by a small team of “retrievers.” Insert colored paper as a place-holder for each ballot so that extracted ballots can be easily reinserted after Step 8.

Note: the “ballot manifest” is any tracking tool that facilitates these steps. We are expecting that this will take the form of a spreadsheet that can be sorted, searched, and highlighted.

8. Compare ballots in the sample with the corresponding CVR entries. Because risk-limiting audits involve comparing individual ballots to the voting system results for each ballot, the audits do not involve a “tally” or count in the traditional way a 1% manual tally is conducted. That is, a 1% manual tally ballot counters are assembled to tally entire precincts or batches of ballots and compare the hand tally totals to the totals produced by the voting system for the same precinct or batch. For risk-limiting audits, a human eye interpretation of each ballot is compared to the CVR for that ballot as recorded by the voting system, so ballots are not “tallied” or counted up and totaled in the usual manner. Instead, we will track any discrepancies we find.

Compare each ballot as follows:

1. Retrieve the ballots chosen for the sample. Those designated to retrieve ballots should not have access to the CVRs for the ballots they retrieve in order to ensure the integrity of the audit.
2. Retrieve the CVR entry for each ballot using the serial number on the ballot (the highest serial number if there are multiple serial numbers) and determine whether the entry matches the human eye interpretation of the votes on the corresponding ballot. Existing ballot interpretation methods may be used, including local rules for determining voter intent.
3. Ensure public observers have the opportunity to compare the CVR entry with the physical ballot. If the public observers or auditors disagree about the interpretation of the votes on the ballot, record the disagreement in a log of the audit process.
4. Record the interpretation of the vote on the physical ballot as determined by the auditors in the log of the audit process. This will be used if the audit escalates to all ballots.
5. Document and share with the public any differences found between the human interpretation and the voting system interpretation. Keep accurate track of all observed discrepancies and the specific candidates they apply to. Tally the understatements and overstatements, if any; they are needed to size the escalated audit sample, if necessary.
6. Document and share with the public any instances in which one or more public observers disagreed with the comparison.
7. Establish procedures to handle observer challenges to the audit. The public must be allowed to observe, verify and point out procedural problems without interfering with the process.
8. Return each sample ballot to their original boxes.

9. Stop or escalate the sample size if necessary. Depending on the number and type of overstatements and understatements found in the initial sample, the audit may need to be expanded to look at more ballots. To determine how many more ballots should be hand tallied, if any, assuming a similar rate of over/under statements:

1. Go to the [Post-Election Audit Tools Website](#) and follow the instructions to determine whether escalation is necessary.
2. If escalation is necessary, the elections official should explain to the public that the audit might lead to a full hand count if significant differences persist.
3. Retrieve the additional ballots, if any, required by the escalation instructions, and continue the ballot interpretation comparison process until either the process terminates (no additional escalation) or all ballots have been compared.

10. Finish and publish results. If the audit process terminated before all ballots have been compared (the most likely case), then the outcomes (winners) reported by the tabulation system in the SOVC are accepted. If the process terminated because all ballots were compared, then the set of vote discrepancies observed during the audit and the log of ballot interpretations can be used to adjust the outcomes reported in the SOVC. In this case, the outcomes of the election are those resulting from the audit. In either case:

1. Release the results of the audit to the public and the Secretary of State.
2. Record and report the time it took to conduct the audit, with a breakdown of the time needed to scan ballots compared to the time needed to conduct the RLA.
3. Record and report the cost of the audit.

Appendix. Detailed Procedures for the RLA in case someone wants to implement all the steps rather than using the online Audit Tools Website.

1. Validating the CVRs in Step 4. This step requires a program that accumulates ballot selections for each contest. This program will need to be specific to the format of the CVRs or the list of CVRs in spreadsheet form (LVR).
2. Initial sample size in Step 6. The initial sample size is given by the formula:

$$n_0 = -2g \log_e(a) / ((m + 2g(r_1 \log_e(1 - 1/(2g)) + r_2 \log_e(1 - 1/g) + s_1 \log_e(1 + 1/(2g)) + s_2 \log_e(1 + 1/g))))$$

with

m = diluted margin,

a = risk limit,

g = 1.03905,

r₁ = expected rate of 1-vote overstatements per ballot,

r₂ = expected rate of 2-vote overstatements per ballot,

s₁ = expected rate of 1-vote understatements per ballot, and

s₂ = expected rate of 2-vote understatements per ballot.

The diluted margin is the smallest margin in votes, divided by the total number of ballots cast for each contest, including undervoted and overvoted ballots.

The number n_0 is then adjusted to take into account the fact that differences must be round numbers, as follows: The expected number of differences in the sample of each type is n_0 times the expected rate of those differences. The expected numbers are either rounded to the nearest whole number, or rounded up. Then those numbers of discrepancies are plugged into the stopping rule described below, to determine how many ballots would have to be audited if the estimated number of differences of each type were to be observed in the sample. That number is then used once again to estimate the number of differences of each type the sample would contain; the results are rounded to the nearest integer and plugged into the stopping rule a second time. The result is then the starting sample size.

3. Random number generator in Step 7. The AuditTools page implements a good pseudo-random number generator based on the SHA-256 hash function. There are [many other possibilities](#), both programs and servers.
4. Stopping rule and escalation size in Step 9. The stopping rule implements the following formula:

$$\text{stopping sample size} = -2g(\log_e(a) + o_1 \log_e(1 - 1/(2g)) + o_2 \log_e(1 - 1/g) + u_1 \log_e(1 + 1/(2g)) + u_2 \log_e(1 + 1/g)) / m$$

with

m = diluted margin,

a = risk limit.

o1 = number of 1-vote overstatements in the sample,

o2 = number of 2-vote overstatements in the sample,

u1 = number of 1-vote understatements in the sample, and

u2 = number of 2-vote understatements in the sample.

g = 1.03905, but any value greater than one can be used. For g = 1.03905, a two-vote overstatement increases the sample size by five times as much as a one-vote overstatement. The estimates based on differences continuing to occur at the observed rate are based on the method described above for estimating the initial sample size, including the method of rounding the expected number of differences of each type.

5. Outcome adjustment, if necessary, in Step 10. If the audit goes to a full hand count, the vote totals in the SOVC will need adjustment according to the recorded discrepancies (under-counts and over-counts for each candidate), together with the manual tracking in step 8.4.

The January 2017 Mock Election

The mock election, as originally planned, consists of 29699 ballots, all with the same 6 contests. Since these ballots have already been scanned, we know the official outcomes:

Best Picture (vote for 3)

Bridge of Spies	15500
Mad Max Fury Road	17699
The Big Short	16499
The Brooklyn	8200
The Martian	13400
The Revenant	12000
The Room	5000
The Spotlight	799

Best Actor in a Leading Role (vote for 1)

Eddie Redmayne	5000
Leonardo DiCaprio	799
Matt Damon	12000
Michael Fassbender	11900

Best Actress in a Leading Role (vote for 1)

Brie Larson	5500
Cate Blanchett	5000
Charlotte Rampling	6900
Jennifer Lawrence	5799
Saoirse Ronan	6500

Best Actor in a Supporting Role (vote for 2)

Christian Bale	16900
Mark Ruffalo	10500
Mark Rylance	10500
Sylvester Stallone	7299
Tom Hardy	14199

Best Actress in a Supporting Role (vote for 2)

Alicia Viander	14200
Jennifer Jason Leigh	12699
Kate Winslet	6500
Rachel McAdams	11299
Rooney Mara	14700

Oscars be Funded by the US Government? (vote for 1)

No	14999
Yes	14700

These ballots will be scanned again during the mock election so it is possible that a few ballots will be interpreted differently. There are no undervotes on these ballots.

The diluted vote margin for each of these contests and the corresponding initial sample sizes (for a 10% risk limit and zero anticipated understatements and overstatements) are as follows:

Category	Diluted Margin	Initial Sample Size ($4.8/\text{margin}$)
Best Picture	$(15500-13400)/29699=0.071$	68
Best Actor	$(12000-11900)/29699=0.0034$	1426
Best Actress	$(6900 - 6500)/29699=0.0135$	357
Best Supporting Actor	$(14199-10500)/29699=0.125$	39
Best Supporting Actress	$(14200-12699)/29699=0.051$	95
Oscars Funded by U.S.?	$(14999-14700)/29969=0.010$	480

These 29699 ballots will be augmented with 300 ballots filled out by Commission members. The outcomes (winners) are unlikely to change, but the margins and initial audit sizes may be adjusted slightly.

[ARS § 16-612(A)]

Duplication Board Instructions

Composition of Duplication Board

Each duplication board shall consist of two members, who are registered voters not of the same political party. An inspection board may serve as a duplication board.

Responsibilities

The duplication board duplicates damaged ballots or ballots that were not marked according to instructions if the voter has indicated his or her clear intent by marking the ballot in a consistent manner as set out above.

Damaged Ballots

A damaged ballot is a ballot that has been torn or crumpled or for some other physical reason cannot be fed into the tabulation equipment. An unreadable ballot is a ballot that has been marked by the voter, but which has been marked with a device that the tabulation equipment cannot read, such as red or green ink, or in any manner that clearly indicates the intent of the voter, but which cannot be read by the tabulation equipment.



Duplication of Early Ballot Procedures

These procedures apply only to early ballots because the voter has the option of correcting his or her ballot at the polling place, and those ballots will be read by the precinct-based tabulation unit.

If a voter has voted for a candidate printed on the ballot *AND* also voted for that same candidate by writing in the candidate's name as a write-in and marking the arrow or oval next to the candidate's name, the equipment reads that office as overvoted. These overvoted ballots are not duplicated.

If a voter has consistently marked his or her ballot by circling the names of the candidates or circling yes or no for issues, or placing an "x", check mark, punched hole or other similar mark next to the voter's choices, the equipment reads the ballot as a blank, unvoted ballot. The ballot shall be sent to the duplication board. If the voter has correctly marked his or her choices by connecting an arrow or filling in an oval in some positions on the optical scan or digital scan ballot, any other markings on the ballot shall be disregarded, shall not be considered votes and shall not be duplicated onto a duplicated ballot.

Election Related Bills at the Legislature

PCEIC - Beard

February 2017

Bill	Description	Sponsor	Status
HB2019	Community College Bonds Must be Voter Approved	Leach	2 nd Read
HB2049	Provisional Ballot Tally	Friese	2 nd Read
HB2053	Campaign Finance – Corporation Must Register	Clark	2 nd Read
HB2055	Ballot Defects – Recorder notification	Clark	2 nd Read
HB2056	Random Audits of Ind Exp Committees	Clark	2 nd Read
HB2068	Ind Expenditure- Corporation Funding Disclosure	Clark	2 nd Read
HB2083	Remove Budget Increase language in insert Local Control funding	Rubelcava	2 nd Read
HB2086	Prohibit Municipality ID Cards	Lawrence	3 rd Read
HB2162	Justice of the Peace Must reside in the precinct	Boyer	2 nd Read
HB2178	Consolidated elections – Prohibit counties running Municipal election solo	Ugenti-Rita	2 nd Read
HB2255	Ballot Measure Prohibit Expenditure from Non AZ Residents	Thorpe	2 nd Read
HB2260	Temporary Address for College Students may not be used for Voter Registration	Thorpe	2 nd Read
HB2272	Ranked Voting	Clark	2 nd Read
HB2273	SOS Appropriation for Election System Security	Clark	2 nd Read
HB2274	Signature Gathering – Preventing Gathering a Line Item in finance reports	Clark	2 nd Read

Bill	Description	Sponsor	Status
HB2275	Make Recorder a Non-Partisan office	Clark	2 nd Read
HB2276	Establish Election Law Review Commission	Clark	2 nd Read
HB2277	National Popular Vote	Salman	2 nd Read
HB2302	Electoral College Votes – Class 3 Felony if they don't vote for winner of state election	Kern	2 nd Read
HB2304	Voter Guide – Email Option	Kern	2 nd Read
HB2316	Precinct committeeman term of office	Lawrence	2 nd Read
HB2317	Party Designation on Ballot	Lawrence	2 nd Read
HB2320	Ballot Measures – Prop 105 Disclosures	Ugenti-Rita	2 nd Read
HB2321	HOA Voting – Prohibit Cumulative Voting	Clark	2 nd Read
HB2339	PPE Reimbursement to counties	Coleman	2 nd Read
HB2348	Automatic Voter Registration	Clark	2 nd Read
HB2349	Early Ballot Collection	Clark	2 nd Read
HB2350	PPE – Ind Voters Allowed to Vote	Clark	2 nd Read
HB2351	Early voting Hours of Operation	Clark	2 nd Read
HB2380	Precinct committeeman term of office	Ugenti-Rita	2 nd Read
HB2381	Email Party Election Notifications	Ugenti-Rita	2 nd Read
HB2403	Clean Elections Prohibited contributions	J Allen	2 nd Read
HB2404	Petition Circulators Must Register	Leach	2 nd Read
HB2412	Voter Registration Records Cost	Coleman	2 nd Read

Bill	Description	Sponsor	Status
HB2416	School Board Members – No Family Ties on the Board	Coleman	2 nd Read
HB2448	Voter Registration – ID requirements	Thorpe	2 nd Read
HB2456	Presidential Candidates Must Release 5 years of tax returns to appear on ballot	Salman	2 nd Read
HB2480	School funding elections overrides	Grantham	2 nd Read
HB2484	Primary Election Date	John	2 nd Read
HB2486	Candidate Committee Names	John	2 nd Read
HB2495	Consolidated Elections	Payne	2 nd Read
HB2531	Apply Clean Elections to County Offices	Powers-Hanley	1 st Read
HCR2002	Repeal Prop 105 (1998 version)	Ugenti-Rita	2 nd Read
HCR2004	Clean Elections Repeal	Leach	2 nd Read
HCR2006	Article 5 Convention	Thorpe	2 nd Read
HCR2007	Prop 105 Exemptions	Ugenti-Rita	2 nd Read
SB1185	Precinct Committeemen term of office	Kavanaugh	2 nd Read
SB1191	Email Authorized for Notifying Political Party Election Notices	Petersen	COW
SB1193	Election and Ethics Commission	Quezada	2 nd Read
SB1200	Candidate Requirement – Must be a registered member of the party day of filing	Kavanaugh	2 nd Read
SB1220	Same Day Voter Registration	Quezada	2 nd Read
SB1221	Voter Registration Deadline	Quezada	2 nd Read
SB1222	Voter Id- Eliminate	Quezada	2 nd Read

Bill	Description	Sponsor	Status
SB1223	Voter ID – VA, Student ID Valid	Quezada	2nd Read
SB1224	No Family ties for School Board Members	Quezada	2 nd Read
SB1237	Early Voting Processing	Kavanaugh	2 nd Read
SB1238	Early Ballot Envelopes	Kavanaugh	2 nd Read
SB1249	Automatic Voter Registration	Quezada	2 nd Read
SB1271	County Permission – Vote by Mail	Worsley	2 nd Read
SB1305	Election Equipment – Procedures Manual	Kavanaugh	2 nd Read
SB1306	Uniformity of Statewide Election results	Kavanaugh	2 nd Read
SB1307	Voter Registration for PPE	Kavanaugh	2 nd Read
SB1328	Clerk of the Board – Election Proclamation	S. Allen	2 nd Read
SB1370	Unlawful Voting – Knowingly voting in multiple locations	Griffin	2 nd Read
SB1375	School Elections	Montenegro	2 nd Read
SB1385	Use SS# to verify Voter Registration	Quezada	2 nd Read
SB1386	Statewide Voter Registration Portability	Quezada	2 nd Read
SB1387	Early Vote Center Hours of Operation	Quezada	2 nd Read
SB1388	Early Ballot Postmark – Election Day	Quezada	2 nd Read
SB1389	Vote Centers at Colleges	Quezada	2 nd Read
SB1390	Electronic Poll Lists – Direct Voter to correct Poll with a Duplicate Form	Quezada	2 nd Read
SB1391	Polling Place Standards	Quezada	2 nd Read

Bill	Description	Sponsor	Status
SB1392	Early Ballot –Vote at the Polls	Quezada	2 nd Read
SB1393	PPE – Independents Authorized to Vote	Quezada	2 nd Read
SB1394	Provisional Ballot – Partial Tally	Quezada	2 nd Read
SB1395	Provisional Ballots – Verify Tally	Quezada	2 nd Read
SB1396	Provisional Ballots – Authorized to count valid votes – discard the rest	Quezada	2 nd Read
SB1397	Early Ballot Verification – Recorder Notice to Voter	Quezada	2 nd Read
SB1405	School Elections – Ballot Argument Language	Lesko	2 nd Read
SB1416	Forming Revitalization Districts	Pratt	2 nd Read
SB1480	Revisions to Community Financing Districts	Smith	2 nd Read
SB1499	Ranked Voting	Mendez	2 nd Read
SB1500	Presidential Candidate Requirement to release 5 years Tax Returns to appear on ballot	Mendez	2 nd Read
SCR1013	Signatures for Initiative/Referendum	Kavanaugh	2 nd Read
SCR1033	Voting Age to 16	Mendez	2 nd Read

For more information on specific legislation - <http://www.azleg.gov/Bills.asp>

ATTACHMENT 5

DRAFT

The EIC Subcommittee on Election Legislation met on Jan 11, 2017 to discuss election legislation, resulting in the following list of topics for review by the full Commission:

Suggested Revisions of Arizona Election Law

- 1) Eliminate the EAC certification requirement (16-442) and place some meaningful technical review requirements on the equipment approval committee (16-502, 507). Require testing by an accredited lab using standards appropriate for the equipment being tested (16-442).
- 2) Remove names of presidential electors from ballot (16-502, 507)
- 3) Audits should be required, and counties should be able to audit additional races (16-602). Allow counties to use independent ballot scanning systems (like ClearBallot) for auditing.
- 4) Retain ballot images the same period as paper ballots and allow for distribution of ballot images (16-624)
- 5) Allow, but not require, approval or ranked voting (16-647, 650)
- 6) Rewrite recount trigger statute. Current law has meaningless triggers. The trigger is generally smaller than the vote variance seen in recounts. (16-661)
- 7) Change 5 day challenge to at least 10 days (16-673)
- 8) Eliminate the ban on "ballot harvesting". Unenforceable. (16-1005H)
- 9) Require release of database information statewide (e.g., CVRs and SOVC). (New)
- 10) Ease rules on regaining the right to vote after felonies. Make it easier for felons in more than one county to regain voting rights all in one court.
- 11) Move primary election to May or June (16-201, *10th Tuesday prior to general*)
- 12) Clarify voter intent rules for ballot duplication (16-621)
- 13) Require consistent procedures for overvoted ballots. Pima County reviews overvoted early ballots, but not overvoted precinct ballots. (New)
- 14) Clarify the need for voter anonymity, but without a ban on showing anonymous ballot images. Clarify illegality of placing any voter identifying marks on ballots. (16-1018)
- 15) Replace "precinct committeeman" with "precinct committeeperson".
- 16) Review and revise Procedures Manual before each statewide election (16-452).
- 17) Require uniformity of election reporting to state in easily decipherable format. Include breakdown by polling place, early, and provisional. Include number of in-district ballots. (16-622).
- 18) Maintain existing petition language (19-204). Others have recommended change that would have AZSOS prescribe petition language and change compliance level from "substantially" to "strictly."
- 19) Maintain requirement for petition signature in 5 counties (16-801). Others have recommended removing this requirement.

Deletions

Proposed deletions refer to tally boards that at one time actually counted votes in public at the polling places, or to lever machines that no longer exist:

Title 16 Sections 517, 531, 601, 604, 605, 606, 607, 614, 615, 616, 618, 619, 620, 641, 643.