

Post-Election Audits of the Ohio November 2008 General Election

Drafters' Introduction to the OH-SOS:

- This proposed Directive for Ohio Post-Election Audits uses the March Directive 2008-39 as a baseline to provide additional and substitute provisions that we recommend for Secretary Brunner's planned post-election audit Directive.
- The Joint Audit Working Group (which wrote the Ohio Audit White Paper) was supplemented by other members of the OH-SOS VRI Advisory Council workgroup on voting technology and audits to prepare this submission. Drafters included some national experts on post-election audits. All individuals and the Workgroup itself offer to be available to provide additional assistance on audit policy and practices for the November election. Questions can be directed to Ron Olson (216-235-9991, ron@caseohio.org), who will contact other group members.
- This draft Directive seeks to achieve two primary audit objectives, those that we think should be paramount for Ohio voters, for BOE officials, and for the OH-SOS: 1) verifying that vote recording, tabulation, and election result processes are working at a very high level of accuracy, and thus are correctly reporting the voters' selection of the winning candidate or issue; and 2) providing a check on election process elements, for identifying areas of strong success and needed administrative improvements.
- Although our group has been discussing and working on ideas for Ohio post-election audits since late 2007, our work on turning those ideas into a draft or sample directive started only in mid August. Consequently, some areas are more developed than others and only limited proofreading has been done. There are undoubtedly some mistakes and inconsistencies. It should be considered a source for ideas and specific instructions for the final directive.
- Some discussion boxes (like this one) are included throughout to provide background information, additional clarifications and rationale for our suggestions, and are not meant to be part of the draft Directive.
- We have included detailed steps plus some examples to maximize the prospects of obtaining consistency in audit procedures throughout all 88 counties. The Ohio BOE pattern is for some BOEs to interpret some Directive procedures differently from others. By providing detailed instructions we hope potentially injurious variation will be minimized. The details may also prove helpful in reducing the amount of preparation BOEs (already busy with planning for November) need to do for the audit.
- Ohio's history of conducting recounts (and more recently post-election audits) provides examples of vastly different interpretations among the county BOEs, with some local procedures falling clearly beyond the legally acceptable parameters. **The OH-SoS should plan to send its field staff plus others who are trained in the audit Directive's requirements to attend and be available for on-site consultation in as many BOE audits as feasible. The SOS should prepare its staff and appointees should be prepared to step in if procedural irregularities are occurring.** Local legal compliance with audit and recount procedures should not depend on observers being present and willing to suggest better procedural compliance or worse, to challenge a BOE official in a public setting.
- Text in orange was copied from Directive 2008-39 (with a few minor changes made to the original, e.g., changing references to "presidential primary races" to "presidential race").
- Because time was constricted, we addressed only the most pressing needs in the March Audit Directive. The omissions are not meant to suggest that the provisions cannot or should not be improved.

- We have included some extremely high priority modifications in this submission, plus some that will achieve mid-priority improvements. To be clear, there are some nonnegotiable, *sine qua non* fundamental elements for a valid post-election audit. Regardless of how much of the specific recommendations that follow are included in the 2008 Audit Directive, the fundamental elements of a valid audit are:

“Random selection” (of precincts, or races, etc.) is required to meet the settled definition of random selection, i.e., all units of the set, must have an equal chance of being selected. The precinct selection process in Directive 2008-39 was not random, and should be corrected in the general election post-election audit rules.

The hand counted results must be compared against results obtained in the official canvass. Doing a hand count of a set of ballots and then comparing them with results after running them through a scanner is interesting, but does not check the overall process of counting, tabulating and report official results.

Observers (independent from those officials conducting the audit) must be able to independently monitor all elements of the audit process. This includes seeing ballot selections, precinct lists for selection, precinct selection, etc, before they are cut or divided for random selection processes. Being assigned a position from which they must watch from a distance without being able to see the details of each step, or being allowed to review particular audit steps after they have occurred, is not sufficient. The SoS must require that the BOEs permit at least one observer to collect from other observers their concerns, and, without impeding the audit, to offer suggestions to the local officials, ask questions, and raise objections to possibly improper procedures.

Audit of the chain of custody and VVPAT verification are essential steps in the post-election audit. Counting ballots that have possibly not been secured properly is of questionable value. The same is true for counting electronic votes because the VVPAT has been compromised. Checking these points in the randomly selected precincts must be a part of the audit.

A detailed final county BOE Audit Report should be distributed to SoS and the public, even if a preliminary short audit report is provided. The final report must include sufficient detail to allow Ohio election officials and the public to determine what is working well, what needs improvement, and what types of action steps would be effective remedies for any problems identified. Examples of audit details to be reported include information on discrepancies in electoral results, compromised VVPAT’s, and chain of custody checks on election materials. If not included with the report of election officials, an observers’ report should be attached to the audit report from the BOE.

Re: Post Election Audits

R.C. 3505.27 provides minimum requirements for counting and tallying of ballots. It further provides that the Secretary of State or a board of elections may "order other requirements to "assure an accurate count of all votes cast." After recent findings in the Evaluation and Validation of Election Related Equipment, Standards and Testing (EVEREST) project, it is our duty to ensure that the vote totals from computerized vote tabulation systems match that of the official ballots, whether it is paper optical scan ballots or the voter verified paper audit trail (VVPAT) on direct recording electronic (DRE) voting systems. To ensure the accuracy and integrity of elections in the State of Ohio and to move toward the adoption of "best practices" the following procedures for Post-Election Auditing are established.

POST-ELECTION AUDIT PROCEDURES

Scheduling and Completion Date: All county BOEs must conduct a post-election audit that commences after the BOE has completed its official canvass and submitted those preliminary results to the OH-SOS. Ideally, a county would complete its official canvass well before the certification deadline and thus conduct the post-election audit before certification. But some counties' BOEs, especially in the more populous counties, will be unable to complete an audit prior to the required certification date. For any county BOE that certifies the results before auditing, the BOE must schedule the audit to begin no later than the day following certification and staff the audit such that the audit results are complete and any amended certification can occur no later than _____
[recommend at least 3 days prior to the deadline by which the results must be certified for the presidential election and Electoral College, in case the SOS or Attorney General needs to take additional steps of inquiry].

Post election audits will be transparent and open to the public. Therefore, board members must fix the time, method and place of the audit and give public notice by either proclamation or posting of the notice in the same manner that they notify the public of board of elections meetings.

Background

- The audit must occur on the completed official canvass. *Reason:* the audit must include all ballots and comparing against the preliminary canvass would find discrepancies caused by the provisional ballots and late arriving absentee ballots.
- The audit should be completed before certification so corrections can be made before that step, rather than amending the results.
- If audit tiers are based on margin of victory, the margin from the official canvass should be used. For statewide races, this means that all counties must complete the official canvass before the tier can be determined and auditing can begin. If the decision is made to allow counties to start auditing races based on unofficial margins, provisions should be made to increase the level of auditing if the margin of victory in official canvass the margin moved the race to a tier with a higher audit percentage.
- In counties that cannot complete before certification, an audit will often require the amending of certification to reflect the audited results.
Harmonizing audit procedures with those of Recounts: **The law is somewhat murky.** If staff and physical space provide feasibility, both legally compelled and by choice recounts could be

conducted concurrently. If the legal interpretation is that recounts must be completed first, they must be staffed and conducted to allow sufficient time for proper audit completion.

- We also recommend consideration of an **Ohio Election Audit Board**

To promote maximum public confidence in the post-election audit and thus in the election itself, the audit should not be managed or issued solely from the State officer whose operations are to some degree under review. We recommend that the November 2008 audit be officially conducted by an Ohio Election Audit Board (or other name) under policies and procedures generated by this Board.

Composition: The Audit Board should have representatives from both major political parties, plus nonprofit organizations which have been involved in election auditing and accountability. Additionally, it should have Board members who are experienced auditors. We believe a feasible and expeditious way to approach auditing the November general election is for Secretary Brunner, Attorney General Rogers, and Auditor Taylor each to name one representative to the Audit Board, and for those 3 Board Members to name the final two members. Appointments can be coordinated among the State officers to achieve the expertise and representation needed: that at least 2 Board Members must have experience in independent auditing procedures; at least 1 must have Ohio election administrative expertise; both major political parties must be represented; and at least 1 nonpartisan representative with auditing policy and practice involvement is required.

Function and Role: Develop the auditing rules for the November General Election; retain a university-based statistical consultant; resolve any policy and practice questions for the audit, including those raised by members of the public and the BOE staff; witness audits on-site to the degree possible; specify the reporting required; receive and publish the BOE audit reports; offer recommendations for improving the post-election audit process and making it a routine part of Ohio elections.

Timing: We urge that the Audit Board be created immediately, so that the auditing policies and procedures for November 2008's general election can be determined with appropriate deliberation and care.

Rationale: We believe the task of rebuilding the electorate's authentic confidence in Ohio's electoral system would benefit greatly by separating the conduct of the post-election audit from the State's supervisor of local election boards. This officer, the Secretary of State, also issues the administrative rules governing large portions of counties' conduct of elections, including the counting of votes. When validly auditing any person's or office's work, some independence of the evaluation and auditing process is important to avoid conflicts of interest and to promote high confidence in the assessment. With less singular control of election auditing policies and auditing results, the Ohio Secretary of State could then clearly stand on the side of greater transparency and continual election improvement in Ohio. We believe no emergency statute would be required; this Board or Task Force could be convened by mutual agreement of the three State officers, possibly with the Governor's explicit endorsement.

Contests to Audit

Principles:

1. The most controversial of races can be identified for a mandated audit.
2. To promote integrity in all election contests and deter targeted mischief, all races and ballot issues must be included in the range of audit possibilities, from which the contests will be randomly selected for audit. [See later section on Random Selection procedures.]

Application of these Principles

1. President: In the November 2008, General Election, the race for President must be audited
2. Congress: at least one congressional race must be audited. In any county that is split into more than one congressional district, all congressional races must be placed into one “pool” from which at least one will be randomly selected for auditing.
3. State of Ohio Offices: Each county BOE shall generate 3 separate pools of races for random selection of at least one contest from each pool, where the particular contest occurs on any ballot distributed in the county:
 - (a) Ohio General Assembly races (Senate and House placed in same pool)
 - (b) Ohio Judicial Races (all judicial races for any level of court placed into one pool)
 - (c) All ballot questions and issues, statewide through city and school district will be placed into one pool.
4. BOE Choices: A Board of Election may choose to audit additional county races. **The board may honor requests from the public for audits of particular races or issues, but is not required to do so. Decisions on additional races or questions or issues to audit should be based on staffing and time considerations so as to ensure accurate and timely auditing of the Presidential race.**

Pre-Election Audit Preparation

1. Before the audit, the BOE should issue written procedures to govern handling and counting the ballots to guide the auditing teams. These can be similar to those that are used for recounts.

Voted ballots must be handled only by the members of the board of elections, its director, deputy director or other designated employees of the board.

Public observers must be allowed to observe, verify and identify procedural mistakes in all phases of the audit without interfering in the process. Observers must be given sufficient access to verify and observe the random selection procedures for the audit as well as the manual count with reasonable opportunities for public comment. The observers are permitted to take notes and photographs of any audit documents that are public record so long as the audit processes are not interrupted. Seating for observers must be provided in a location that allows the observers to see all the marks on the selected ballots, and in the random selection processes.

Adequate public notice must be provided to allow the public to observe each phase of the audit. At least 3 days advance notice should be provided.

To facilitate the observational process and its function to promote public accountability and legitimacy for Ohio elections, Boards of Elections should publicly announce the commencement date start of audit and reach out to election integrity advocate organizations and political party/candidate organizations for assistance. With sufficient advance time, organizations can recruit and train a sufficient number of audit observers to be present throughout the entire auditing process.

If any subsequent auditing phases occur after the initial audit, these should also be announced publicly as well as to all persons who expressed an interest in the original audit or to whom BOE announcements are commonly made. This should involve compiling an electronic or phone list of everyone who has stated an interest in observing the audit.

Reasonable and expected notice includes notifying interested individuals and organizations of the BOE's audit plan and any credentialing process for observing.

Background

- Elections belong to the people. A citizen observation of the audit provides a critical layer of public verification of the results and serves to increase public confidence in the election outcomes.

After Official Canvass

2. After the official canvass is completed, each Board of Elections must provide all election results by precinct.

The BOE must publish official results by precinct

- (a) Precinct name/number
- (b) Total number of the votes cast plus undervotes on each contest
- (c) Poll book reconciliation counts for each precinct (e.g., count of total ballots delivered to precinct, regular voter signatures, provisional ballot signatures, spoiled/defaced ballots, and unused ballots)

This list should be provided to the state and made available to the public before the audit (in computer readable spreadsheet format).

Background

- The audit will be compared with the official totals and having those totals available is necessary to complete the audit.
- Counties that can report precinct totals divided into absentee ballots, accepted provisional ballots, rejected provisional ballots and regular (Election Day) ballots should be encouraged to do so. The additional data could make it easier to identify audit discrepancies and provide information to the State on trends in use of absentee and provisional ballots.

After all Official Canvass' received by the state

3. The state will determine the percentage of precincts to audit.

For statewide races such as President, the percentage of precincts to audit is based on the following tiers and margins.

<u>Margin of victory</u>	<u>Precincts Audited</u>
Over 4%	1%
2% to 4%	2%
1% to 2%	4%
0.75% to 1%	5%
0.5% to 0.75%	8%
0.45% to 0.5%	9%
0.4% to 0.45%	10%
0.35% to 0.4%	11%
0.3% to 0.35%	13%
0.25% to 0.3%	16%
Under 0.25%	100%

For Congressional district races, the percentage of precincts to audit is based on the following tiers and margins

<u>Margin of victory</u>	<u>% Precincts Audited</u>
Over 27%	1%
17% to 27%	2%
13% to 17%	3%
11% to 13%	4%
9% to 11%	5%
8% to 9%	6%
7% to 8%	7%
6% to 7%	8%
5% to 6%	10%
4% to 5%	13%
3% to 4%	18%
2% to 3%	27%
1% to 2%	49%
0.75% to 1%	61%
0.5% to 0.75%	69%
Under 0.5%	100%

Margin of victory is calculated based on the difference in votes of the top two candidates (or issue selections) divided by the number of votes cast in the contest (not the vote total of the two candidates). If the margin is exactly on a tier boundary (i.e., 1.00%), the higher audit percentage tier is selected (i.e., for a statewide audit, a 1.00% margin would result in a 5% audit).

The State will provide the percentage of precincts to audit for each race. Here is an example using fictional results and including two congressional districts whose Member of Congress is elected by voters in more than one county.

Race	Margin	Percentage of Precincts to Audit
President	2.1%	2%
CD 12	5.9%	10%
CD 18	12.2%	4%

The State may also direct that specific “challenge” or “target” precincts with anomalous results be audited in addition to the precincts selected randomly.

Background

- We have provided more tier levels than are typically used in order to provide some of the benefits of a statistical audit while greatly simplifying the necessary calculations. The tiers are used once by the State for each audited races, so the number of tiers adds negligible extra work.
- The benefits of these tiers are substantial when compared to a fixed audit or a tiered audit like the 3/5/10 levels proposed in HR 811. Fixed audits or tiered audits with only a few tiers either do not count enough votes on close races (which is when an audit is even more important than usual) or count more votes than necessary (and overspend) on races that are not close or have victory margins close to the upper end of a tier. **Note:** these tiers are calculated for a 99% confidence level based on the number of precincts in Ohio and the number of votes cast in recent elections. They would need to be recalculated for other states.
- We have set a *minimum* audit size of 1% for statewide and Congressional District races. If a larger minimum is desired, the tiers with the 1% minimum audit size can be removed, and tiers with larger minimums can be extended to replace them.
- The *maximum* audit sizes should be left intact. Removing these tiers will reduce confidence levels for close races.
- If a smaller number of tiers are desired, always replace any tiers that are removed with a tier that requires *a larger audit size*. Otherwise, *confidence levels will be reduced*.
- The Congressional District audits require higher audit percentages because the number of precincts (audit units) is smaller than for statewide races. If the confidence level is dropped from 99% to 95%, the percentage of precincts to audit for the margins above would drop by about one quarter.
- “Challenge” or “Target” precincts allow for counties with clearly (but subjectively) anomalous results to be included in the audit. This could occur if a DRE memory card or batch of Optical Scan ballots were missed or processed twice. An audit, which is designed to check the accuracy of a process by checking a random sample, cannot uncover problems in all counties. Common sense dictates officials and candidates should seek to investigate a precinct’s results where a mistake may have occurred. The difficult part is how to do this fairly. Allowing statewide candidates to select five precincts and non-statewide candidates to select two precincts would be a feasible way to proceed.
- If county races (beyond statewide and congressional districts) are audited and a confidence level is desired, additional tiers would be needed. If a particular confidence level is not used, a specific percentage of precincts could be used.

Performing the Audit

Selecting the Precincts

4. The Board must randomly select the number of whole precincts based on the percentage specified by the state in the previous step.

First, the county shall determine the number of precincts to be audited for each race by performing the following steps

- (a) Multiplying the number of precincts in each race by the percentage of precincts to be audited
- (b) Round up to the next highest integer
- (c) Decide if any additional precincts should be selected in case they are needed. Counties that use DRE's may want to select additional precincts than necessary to avoid having to make more selections if VVPAT's are found to be compromised and cannot be used in the audit. If extra precincts are selected, the order they were selected should be recorded. If these extra precincts are needed, they should be used in the order they were selected.

Here is an example (with approximate number of precincts) from Licking County which has two Congressional districts. A form like this with room for writing in the precincts as they are selected might be useful to print out and provide to participants and observers.

Item	President	CD 12	CD 18
Percentage of precincts to audit	2%	10%	4%
Precincts in race	128	83	45
Precinct count multiplied by percentage and divided by 100	2.56	8.30	1.80
Number of precincts to audit (round up)	3	9	2
Number of additional precincts to select in case extra precincts are needed.			
Precincts selected for the audit			
Additional precincts selected in case extra precincts are needed.			

The selection of precincts must be done at the beginning of the audit and be followed immediately by the start of hand counting the votes.

Random Selection Methods

Either of the following methods will produce a scientifically random selection, whether of precincts, or races or other contests. **For ease in explanation, random selection of precincts is the example used here.**

Method 1: Drawing Lots or Drawing from a container

Create a printable list of precinct names/numbers (e.g., sorted by jurisdiction and ward number or whatever order is commonly used by the county) in equal size boxes that are at least 1 inch high and two inches long

- (a) Make the lists available before the audit for review by interested parties
- (b) At the beginning of the selection process, let any interested reviews check the pages that will be used for the audit
- (c) Cut the pages into equal size pieces so that each precinct is on a piece by itself
- (d) Put all the pieces in an opaque container large enough to hold them with room to spare
- (e) Mix them thoroughly
- (f) Pick one precinct at a time without looking at the container asking public observers to select the precincts if they are available
- (g) An election official should announce the precinct name and which races will audit the precinct.
- (h) If at least one race needs more precincts, continue selecting.

Method 2: Using 10-Sided Dice

Rolling 10-sided dice to select each precinct (or race):

- (a) Make a list of sorted precincts (e.g., sorted by jurisdiction and ward number or whatever order is commonly used by the county) numbered sequentially starting with 1.
- (b) If there are races being audited that are being audited in only some precincts, the list should indicate which precincts are applicable to those races.
- (c) For counties that want to reduce the number of dice rolls, a column can be added called **Bin Number**. The **Bin Number** is calculated by multiplying the precinct sequence number (that starts at 1) with the largest multiple of the number of precincts that will not exceed the highest possible dice roll (99 or 999 or 9,999).

For example, Licking County has about 132 precincts, so would use three dice. Since 10 sided dice are used, the results of a dice roll will be between 0 and 999. Without **Bin Number**, rolls other than 1-132 will not select a precinct and will have to be rolled again. Since 132×7 is 924, each precinct number is multiplied by 7 to get **Bin Number**. When three dice are rolled, results of 1-7 select the first precinct, 8-14 select the second precinct, and so.

Here is the example from Licking county:

Precinct	Audit Number	Bin Number	President	CD 12	CD 18
Heath 1-A	1	7	Yes	No	Yes
Heath 1-B	2	14	Yes	No	Yes
...					
Newark 2-A	12	84	Yes	Yes	No

- (d) Print the list and make it available (before the audit if possible) to the audit team and observers.
- (e) Obtain enough clear, colored, 10 sided dice based on the number of precincts (2 for 99 or fewer precincts, 3 for 999 or fewer precincts, 4 for 9,999 or fewer precincts, etc) along with a cup to roll the dice from and a box to roll them into.
- (f) Decide which color die is used for each digit needed (1, 10's, 100's, 1000's)
- (g) Roll the dice
- (h) If **Bin Numbers** are not used a precinct is selected if the dice roll matches the **Audit Number**. The roll must be redone if it is zero or higher than the highest **Audit Number**.
- (i) If **Bin Numbers** are used a precinct is selected if the dice roll is less than or equal to its **Bin Number** and greater than the **Bin Number** for any preceding precincts. the roll must be redone if it is zero or higher than the highest **Bin Number**.
- (j) An election official should announce the roll number, the precinct name, and which races will audit the precinct.
- (k) If at least one race needs more precincts, continue selecting.

Background

- Starting the hand counting immediately after selecting the precincts removes any suspicion that precincts have been pre-checked (as was done in November 2004) and discrepancies removed.
- The reason for the sorted list of precincts is to allow observers (and participants) to validate and follow the selection process. If a county decides to use the container with slips of paper for precinct names, an observer should be able to validate that all precincts are included within the container. The only way to do this is to see and verify the list before it is cut into individual pieces. For this to be done quickly and effectively, the list must be sorted in an order than an observer can check against a known list of precincts for the county.
- Providing multiple procedures is encouraged because a procedure that works well for a county with 30 precincts may not work well for a county with over a thousand. Providing at least one procedure with specific steps is important in ensuring that the procedure is followed accurately.

References

- “The Role of Dice in Election Audits” (<http://www.cs.berkeley.edu/~daw/papers/dice-wote06.pdf>) has useful information on selection methods.

5. Each precinct's ballots shall include for the audit all relevant regular ballots (VVPAT and/or optical scan paper ballots), provisional ballots, and absentee ballots tallied and recorded as part of the official count. Sealed VVPAT canisters may be opened for the purposes of conducting the post election audit, even if there is not a recount in the precinct.

All ballots for a precinct to be audited should be collected and may include

- (a) All VVPAT's from the polling place for the precinct
- (b) All VVPAT's used for early voting at the Board of Election
- (c) All absentee ballots cast before the election
- (d) All paper ballots requested and cast on election day
- (e) All paper ballots that arrived after election day but were postmarked early enough to be counted
- (f) All envelopes for challenged absentee ballots and provisional ballots that remain uncounted, with a report about why they could not be counted
- (g) All spoiled ballots from each of those precincts
- (h) All remaining unused ballots from each of those precincts

The following materials should also be gathered for each precinct being audited

- (a) Chain of custody logs for all ballot containers (e.g., VVPAT, Optical Scan boxes). Specifically, the security seal numbers attached on ballot containers on election night after closing the election. If the ballot containers were opened after election night, chain of custody records of seals applied after election night should be available.
- (b) Poll (or signature) books
- (c) Poll worker reconciliation results
- (d) BOE reconciliation results

Background

- A meaningful audit ultimately requires comparing the official canvass totals against the hand count. This requires locating, gathering, and counting all the ballots for a precinct.
- If any BOE's may not be able to easily identify all ballots for a precinct (especially with the large numbers of absentee ballots), procedural changes (e.g., sorted ballots by precinct) may be necessary.

6. Ballots must be checked for valid chain of custody and validity depending on the type of ballot.

DRE VVPAT inspection

In accordance with R.C. 3506.18, the voter verified paper audit trail (VVPAT) serves as the official ballot to be audited.

Open each VVPAT canister that may have votes for the selected precinct(s) and compile the following information

- (a) Race(s) being audited for this precinct

- (b) Precinct
- (c) Polling place
- (d) DRE serial number
- (e) For each canister
 - i. Whether canister was sealed (Y/N)
 - ii. Security seal number found on canister
 - iii. Security seal number recorded by poll worker on election night for the canister
- (f) Whether zero report was found on first canister (Y/N)
- (g) Whether zero report had 0 votes for all candidates in race being audited (Y/N)
- (h) Whether the required number of poll worker signatures were found after the zero report and match the names of the poll workers on the signature book
- (i) Whether the required number of poll worker signatures were found after final report and match the names of the poll workers on the signature book

The VVPAT will be considered compromised and the precinct non-auditable if any of the following are found

- (a) The canister was not sealed
- (b) The security seal number has been tampered with or does not match the serial number recorded on election night (unless the BOE has records of needing to open and re-seal the VVPAT that show a matching seal number)
- (c) The zero report was not found or does not contain 0 voters for all candidates in the race being audited

If any VVPAT for a precinct is considered compromised, then the precinct cannot be audited and a replacement precinct must be selected. If extra precincts were not chosen during the selection process, the first extra precinct should be used.

If any VVPAT's are determine to be compromised, an investigation should be performed within four weeks of the end of the post-election audit to determine the cause and scope of the problem. To determine the scope of the problem, VVPAT's should be inspected (ballots do not need be counted) for an additional set of precincts (the number to match the number of precincts included in the original audit). The public should be notified in advance and included in the inspection. The results of the inspection should be provided to the state and the public

Optical Scan inspection

The following should be checked with container of Optical Scan ballots
 OS ballot container sealed properly according to BOE procedures

Background

- There was a step from Directive 2008-39 that may apply here, but it was left about because it's meaning and operational validity is unclear. Here is the step
 Check the public counters to verify the numbers on those counters correspond to the numbers on the VVPAT and the poll book, poll list, or signature poll book records.

Certainly the counter on each DRE should reconcile with the number of ballots ultimately determined as having been cast on it. But such reconciliation appears to be a low-priority auditing comparison, especially where the DRE's are used across precincts in a polling place, thus not allowing immediate comparison to poll book signatures or Certificate #1's (only circularly, to DREs own generated reports;) and especially since such checks would require much labor in locating each DRE and taking each out of folded storage for proper public observation. Perhaps the starting number and ending on each DRE's counter should be required on its chain of custody log, as delineated in another directive dealing with chain of custody.

- The VVPAT inspection steps are based on knowledge of some, but not all, county procedures.
- The Optical Scan inspection steps are minimal because of a lack of knowledge of how various BOE's perform chain of custody after Optical Scan ballots are delivered from polling places and counted on election night.
- The steps documented in this draft directive do not cover all parts of BOE voting procedures. There would be value in checking
 - A sample of provisional ballots to determine if they were accepted or rejected appropriately
 - A sample of accepted and rejected absentee ballot ID envelopes to determine if they were accepted or rejected appropriately
 - A sample of any paper ballots that were remade (as well as reviewing the number of remade ballots compared with other counties and previous elections)

7. The ballots for each selected precinct are hand counted.

All types of ballots for the precinct are counted and compared against the official canvass.

The Board of Elections should determine how many counting teams are necessary for the audit.

For counties that do not have VVPAT's, each counting team should

- (a) Be provided written copies of audit procedures
- (b) Not know the results from the official canvass for any audited races in the selected precincts
- (c) Be comprised of four team members with appropriate party representation
 - i. One **Reader** who calls out the voter's selection on the ballot for race(s) being audited and shows it to all on team
 - ii. One **Sorter** who checks the voter's selection as called out by the **Reader**, and files it into the correct pile for later hand counting
 - iii. One **Tallier** who record votes on a tally sheet as they are called.
 - iv. One **Witness** who watches that each above process is done correctly, and who counts each pile of votes in front of team members at the end to affirm that the tally quantities are the same as the ballot quantities.
- (d) Have one table for counting with chairs for team members and observer(s)
- (e) Have a separate table for ballots already counted and (separately) ballots still be counted
- (f) Have no ballot marking devices available

There should be at least two supervisors from both major parties who

- (a) Monitor all counting teams
- (b) Compare hand counted results with official canvass and tell the counting team if they need to count again
- (c) Resolve discrepancies
- (d) Gather completed tally sheets

The counting process includes

- (a) Supervisors assign a precinct and races to audit to a team
- (b) Counting team fills out tally sheet with date, start time, team member names, precinct number and candidates or issue positions.
- (c) As the **Reader** calls out selections (verified by the **Witness** and any observers), the **Tallier** marks his/her tally sheet.
- (d) When the counts are complete the Supervisor team checks the count against the official canvass and indicates if another hand recount necessary and, if possible, the type(s) of ballot and race(s) that have a discrepancy.
- (e) If a second count does not match, a discrepancy is noted including details of date, time, team member names; quantities found in hand count, quantity in official count.
- (f) The Supervisor team records the date, time completed, whether the count matched the official canvass, and comments on any discrepancies (if appropriate) to the tally sheet when done
- (g) Supervisors and all team members sign the tally sheet
- (h) If an error is found on a tally sheet after being signed, the tally sheet is not modified. A separate note signed by both supervisors can be attached to tally sheet explaining the problem.
- (i) Ballot containers are closed and sealed with new security seals and the seal numbers are recorded.
- (j) The team moves to the next race and/or the next precinct.

Background

- If counting one race and handling separate ballots (not VVPAT tapes), the **Witness** should gather the ballots into stacks of 10 for each candidate so **Tallier** can check there totals against the stacks every time a candidate's total reaches 10 or 20, etc.
- Another possible method is "sort and stack". In this method, all the ballots are sorted into votes for each candidate so you have 2 or more stacks of ballots. At least one other person goes through and verifies that every ballot in that stack is voted for the particular candidate. Then count the stack (but don't tell how many). Witness or 2 separately counts the stack. Compare totals. All ambiguous votes are set aside for review by the team for voter intent determination, as are all undervotes and overvotes. Same process for each candidate. Etc. Moves much faster than the reading out of each vote.
- We did not have time to address the variation on the counting scheme necessary for VVPAT's. The paper referenced below suggests cutting VVPAT rolls into individual for each voter selection (i.e., ballot).

Reference

- "Procedures for California's 1% Manual tally"
(http://josephhall.org/procedures/ca_tally_procedures-2008.pdf) has useful information on counting procedures

8. Determining if the audit needs to be escalated

The following steps shall be performed by the state for statewide and congressional races to determine if a second round of statewide auditing or a full hand count will be done. The steps should be done once for each race being audited.

- (a) A list of audited precincts should be available that has the following for each precinct
 - i. the margin of victory within the precinct between the top two candidates in the official canvass
 - ii. the margin of victory within the precinct between the top two candidates in the audit
 - iii. **Margin Increase:** the increase (in votes) of the margin of victory in the precinct after the audit (if any)
 - iv. **Margin Decrease:** the decrease (in votes) of the margin of victory in the precinct after the audit (if any)

Note: for the first two items above, if the apparent loser of the contest received more votes than the apparent winner in the precinct, the within-precinct margin of victory will be *negative*. If the apparent winner of the contest received more votes than the apparent loser in the precinct, this number will be *positive*. All negative values must be preceded by a minus sign, i.e., “-“ whenever they are reported in the precinct list.)

- (b) The following should be notes or calculated
 - i. **Preliminary Percentage Margin:** margin of victory in the official canvass (including, overvotes, undervotes and votes for other candidates , but not including corrections after audit results)
 - ii. **Discrepancy Rate:** the total of all **Margin Decrease** values, in votes, divided by the number of ballots counted in the audit for this race (including overvotes, undervotes and votes for other candidates)
- (c) **Trigger 1 (miscount in one precinct):** If there is at least one precinct in any county or counties that has a **Margin Decrease** of 80 votes or more, a second round of statewide auditing should be conducted for this race.

(d) **Trigger 2 (cumulative miscount):**

- i. For non-statewide races with a canvass margin above 1%:

If the **Discrepancy Rate** is greater than 0.2%, a second round of statewide auditing should be conducted for this race.

- ii. For non-statewide races with a preliminary margin of 1% or less and all statewide races,

If the **Discrepancy Rate** is greater than one-fifth of the **Preliminary Percentage Margin**, a second round of statewide audit should be conducted for this race.

The second round of auditing will

- (a) Select the same number of precincts as the first round (unless the first round was 50% or more in which case the second round shall count all ballots for the race)

- (b) Not select any precincts selected in the first round

The decision to conduct a third (and final) round of auditing for each race is based on the same criteria applied after the first round, but using the results from only the precincts audited in the second round.

The final round of auditing will

- (a) Hand count all remaining ballots

To clarify the steps, here is an example in the CD 12 race in Delaware, Franklin, and Licking Counties.

- (a) Candidate A was the leading candidate in the official canvass and Candidate B was in second place.
- (b) The **Preliminary Percentage Margin** (from the canvass for all precincts) was 9.3%.
- (c) The 9.3% margin of victory resulted in 5% of precincts being audited.
- (d) For Delaware County, 7 precincts will be audited (5% of 130 precincts is 6.50% which is rounded up to 7)
- (e) For Franklin County, 19 precincts will be audited (5% of 362 precincts is 18.10% which is rounded up to 19)
- (f) For Licking County, 5 precincts will be audited (5% of 83 precincts is 4.15% which is rounded up to 5)

The table below has hypothetical results for the Licking County part of an audit of the CD 12 race. This provides an example of the precinct level values for Margin Decrease used for **Trigger 1**. For the example, the 20 vote margin decrease for Etna TWP C is the largest value in all three counties.

Precinct	Canvass				Audit				Margin Increase	Margin Decrease
	Cand A	Cand B	Ballots without votes for A or B	Margin of Victory	Cand A	Cand B	Ballots without votes for A or B	Margin of Victory		
Alexandria	100	100	5	0	100	100	5	5		
Bennington	280	320	10	-40	275	325	10	-50		10
Etna TWP C	350	200	15	150	340	210	15	130		20
Jersey TWP A	190	210	10	-20	190	210	10	-20		
Newark 2-A	200	150	10	50	205	140	10	65	15	
Licking Total	1,120	980	50	140	1,110	985	50	125	15	30

Example results:

- (a) **Trigger 1** does not cause an escalation of the audit because largest margin decrease in a single precinct in all three counties was only 20 votes (shown above for Licking County, Etna TWP C), which is less than 80 votes.

The table below has hypothetical summary results for all three counties in an audit of the CD 12 race. This provides an example of the overall results used for **Trigger 2**.

Precinct	Canvass				Audit				Margin Increase	Margin Decrease
	Cand A	Cand B	Ballots without votes for A or B	Margin of Victory	Cand A	Cand B	Ballots without votes for A or B	Margin of Victory		
Delaware Total	1,590	1,370	70	220	1,580	1,370	70	210	40	30
Franklin Total	4,260	3,730	190	530	4,220	3,750	190	470	60	120
Licking Total	1,120	980	50	140	1,110	985	50	125	15	30
Statewide Total	6,970	6,080	310	890	6,910	6,105	310	805	115	180

Example results:

- (a) The **Discrepancy Rate** is 180 divided by 13,325 (total ballots audited) or 1.35%
- (b) **Trigger 2** (for non-statewide races with a margin greater than 1%, this example) does cause an escalation of the audit because the **Discrepancy Rate** (1.35%) is above 0.2%.
- (c) If this had been a non-statewide race with a margin of 1% or less or any audited statewide race, **Trigger2** would have caused an escalation if the **Discrepancy Rate** (1.35%) was higher than one-fifth of the **Preliminary Percentage Margin**

Background

- It is possible to develop simpler rules for escalation of an audit. However, they will almost always result in either escalating the audit in more cases than necessary or reducing the confidence level of the audit. We are available to discuss other alternatives.
- The tiers for precinct selection were calculated so that if no “significant miscount” were found, we could be approximately 99% confident that a full hand count of all ballots would not overturn the results from the official canvass. The decision to escalate the audit to another round is based on whether “significant miscount” was found. There are two types of significant miscount.
 - The first type is when large miscount is found in one (or possibly more) individual precinct(s). This miscount is checked for by looking for one precinct with a change in the margin within the precinct of 80 votes or more. In other words, the margin between top two candidates changes by 80 or more votes (e.g., within-precinct margin changes from +90 to +10, +50 to -30, etc). The threshold of 80 or votes is based on statistical calculations (see reference) of the level of significant miscount based on the average size of Ohio precincts.
 - The second type is when small miscount accumulates across several precincts. This miscount is checked for by totaling all the miscount that reduces the original margin of victory. The threshold is also based on statistical calculations

Another important assumption made in the statistical calculations is if the miscount in an individual precinct is 20% or greater the problem will be found **without a random audit**. Without this assumption the number of precincts to audit would be significantly higher to reach a 99% confidence level. Some examples include

Official Canvass Reports	Actual Results
Cand A wins by 25%	Cand A wins by 5% or less or Cand B wins
Cand A wins by 10%	Cand B wins by 10% or more

This is one reason why it is important to allow “challenge” or “target” precincts (with obvious discrepancies) to be audited in addition to precincts selected randomly. If an error of this magnitude is discovered via a non-random selection, it must be treated the same way as a **Trigger 1** miscount found via random selection, i.e., the random audit must be escalated, and additional targeted non-random selections must be allowed.

Reference

- Percentage-Based versus Statistical-Power-Based Vote Tabulation Audits
http://verifiedvoting.org/downloads/TAS_paper.pdf

After Post-Election Audit is Complete

After you have completed your post-election audit you must file the following with our office:

1. All final results from your audit.

Final results should include the following for each contest audited and each precinct audited for the precinct (including precincts, if any, that had to be rejected because of compromised VVPAT's)

- (a) The votes cast from the official canvass (broken down by ballot type if possible, e.g., election day, early vote by mail, early vote on DRE, accepted provisional)
- (b) The hand counted results (broken down by the same ballot types if possible)
- (c) Poll book reconciliation totals completed before the audit (e.g., regular voter signatures, provisional ballot signatures, ballots issued, regular ballots voted, provisional ballots voted, spoiled/defaced ballots, unused ballots, provisional ballots rejected, provisional ballots rejected)
- (d) For each DRE VVPAT opened: Yes, No, or NA for whether:
 - i. Canister was sealed
 - ii. Security seal number matched number recorded by poll worker
 - iii. Zero report was available and zero totals for race being audited
 - iv. Required poll worker signatures after zero report
 - v. Required poll worker signatures after final vote totals
 - vi. VVPAT was used in the audit
- (e) Final results must be reported to the public immediately and posted on the website of any BOE that maintains a web presence.

2. *If* vote totals in the random candidate's race, question or issue change, a certified amended abstract that show:

- The votes cast in each precinct in its county in which the candidacy or issue was submitted to electors.
- The votes of the precincts in which the ballots were audited as shown by the audit.

then, the board shall amend its certification of the official results of any race or election so affected and submit it to the secretary of state within the time limits set forth in this directive in the same manner required in the making of its original official declaration of the result of such election.

If any VVPAT's were compromised, a report should be provided to the state and the public within four weeks of the end of the post election audit describing the scope and nature of the problem and corrective actions to be taken.

Background

- VVPAT's hold the legal ballots. Reporting on how often they are compromised and how effectively they are being secured is very important.

You may transmit your results to the secretary of state's office via fax at: (614) 752-4360 (If you are sending by fax, please include a cover letter); email to Kathy Malott at: kmalott@sos.state.oh.us or send by certified mail to:

Secretary of State Jennifer Brunner
Elections Division, Attn: Kathy Malott
180 East Broad St., 15th Floor
Columbus, Ohio 43215

If you have any question please contact the Election Division legal staff assigned to your county at (614) 466-2585.

Sincerely,

Jennifer Brunner