

DIRECTIVE 2008-90

September 11, 2008

TO: ALL COUNTY BOARDS OF ELECTIONS
MEMBERS, DIRECTORS, AND DEPUTY DIRECTORS

RE: Pre- and Post- Election Tests of Vote Tabulation Systems

To ensure that all central tabulation systems are accurately and uniformly tabulating votes cast during an election, the following instructions are provided for:

- Overview of Public Test of a Vote Tabulation System
- Conducting a Public Test of a High Speed Central Count Optical Scanner
- Conducting a Public Test of Precinct Based Optical Scanners Used for Either In Person Voting or for Central Tabulation of Absentee Ballots
- Conducting a Public Test of Direct Recording Electronic Voting Machines used for In Person Voting Before or On Election Day
- Conducting Pre- and Post-Tabulation Tests for a Central Tabulation Server for the Unofficial and the Official Canvasses of Votes

Overview of Public Test of a Vote Tabulation System

Under R. C. 3506.14(B), before every election, each board of elections shall publicly test automatic tabulating equipment used in the county to ascertain that it will accurately count the votes cast for all offices and on all questions and issues. In order to satisfy this statutory requirement, which includes the taking of any necessary corrective action, this office directs that such public testing occur in the manner prescribed in this directive and suggests that all boards conduct the public test at least four (4) days before tabulating ballots on the vote tabulation system.¹ This should ensure that the board has time to take any corrective action if necessary.

Because the public test is used to demonstrate the accuracy of the vote tabulation system, multiple checks are necessary to test the accuracy of the entire system,² including the central tabulation server and any ballot marking devices used as part of the system. In preparing such a test, several sets of ballots (i.e., test deck) should be assembled. These test decks should contain races or contests with multiple candidates, candidate rotations, splits within a precinct, multiple questions or issues within a precinct, and, if applicable, write-in candidates.

¹ In the case of testing of a representative sample of DRE voting machines that are to be in use for in person absentee voting during the absentee voting period, "at least four (4) days before tabulating ballots" means at least four (4) days before they are used for early in person voting. A second test may be necessary for DRE voting machines to be used on Election Day.

² This means that testing for optical scan voting systems must include testing of vote tabulation by both central count high speed optical scanners and precinct based optical scanners, as well as testing of ballot marking devices, such as AutoMark voting machines and the accuracy of ballots marked by them. For DRE voting systems, testing is of tabulation by both DRE voting machines used for in person voting and precinct based optical scanners used for either in person voting or for central tabulation of absentee ballots.

Each board of elections must give public notice of the date, time and place of the test, by either proclamation at a public meeting of the board of elections and recorded in the board's minutes or by posting notice as would be required for the holding of a public meeting under the laws of this state.

The board should arrange to have testers who are familiar with the various components of the county's vote tabulation system to conduct the public test. The board should also ensure the testers are available for questioning before and after the actual testing of the system. They should be prepared to discuss details and explanations of the tests with those attending the public test.

The board staff must conduct successful public tests on the vote tabulation system on two occasions:

- Before tabulating ballots for the unofficial count; and
- Before tabulating ballots for the official count.

Conducting the Public Pre-Election Test of a High Speed Central Count Optical Scanner

- The zip drive from a central count high speed optical scanner must be placed in the central tabulation server to verify the "zero count" on the zip drive used by the central count high speed optical scanner to verify there are no votes currently recorded on the zip drive.
- As outlined in R.C. 3506.14(B), a test deck of ballots must be created for the central count high speed optical scanner. The ballots in the test deck must be marked so as to record a predetermined number of valid votes for each candidate and on each question and issue, and they must include for each office one or more ballots marked with too many votes for a given race or question (commonly known as "overvotes") to test the ability of the automatic tabulating equipment to detect and reject those votes. In that test deck a different number of valid votes must be assigned to each candidate for an office, and for and against each question and issue so that the central count high speed optical scanner tallies votes on each race and issue.
- Before tabulating the test deck of ballots on the central count high speed optical scanner, the votes on the test deck must be audited by hand count. The results from the hand count of the test deck must be recorded and announced before tabulating the test deck on the central count high speed optical scanner.
- For counties using optical scan voting systems as their primary voting system, the test deck must include ballots voted on AutoMark voting machines or any other ballot marking device used by voters needing assistance.
- Once the test deck has been voted, the zip drive containing the test votes must be removed from the central count high speed optical scanner and uploaded to the central tabulation server in order to produce a "test count" report.
- The "test count" report of votes that were uploaded to the central tabulation server must be printed from the central tabulation server. The "test count" results from the central tabulation server as they were uploaded from the zip drive from the central count high speed optical scanner must then be announced.

- The results of the pre-audited group of test deck ballots and the “test count” results from the central tabulation server must then be compared and must match.
- If any error/discrepancy in the results is detected, the cause for the error must be determined and corrected, and another test must be conducted. Testing must continue until an errorless test is conducted from start to finish, even if this requires additional public testing days.
- If no errors/discrepancies in results are detected, two “closing zero count” reports must be generated by the tester, one from the zip drive and one from the central tabulating server, to verify there are no votes currently recorded on the zip drive or on the server.
- After the board of elections completes the public testing of the central count high speed optical scanner, that component shall be secured until pre-election scanning of absentee ballots (no tabulation) begins before Election Day and until election night tabulation is conducted after the close of the polls (also known as the unofficial canvass). Boards shall maintain and observe all possible board office and voting system server and machine security protocols during this time.

Conducting a Public Test of Precinct Based Optical Scanners Used for Either In Person Voting or for Central Tabulation of Absentee Ballots

- An “opening zero count” report must be generated from the central tabulation server by the tester to verify there are no votes currently recorded on the system.
- An “opening zero count” report must be generated from each of a representative sample of voting machines (precinct based optical scanners) by the tester to verify there are no votes currently recorded on the individual vote tabulating machines.
- As outlined in R.C. 3506.14(B), test decks of ballots specific to each precinct or precincts for which a precinct based optical scan voting machine has been programmed, with at least ten (10) entire voted ballots to be scanned on that machine, must be created for each voting machine tested. Multiple testers may be used to perform the scanning functions during this phase of the test. The ballots in the test decks must be marked so as to record a predetermined number of valid votes for each candidate and on each question and issue, and they must include for each office one or more ballots marked with too many votes for a given race or question (commonly known as “overvotes”) to test the ability of the automatic tabulating equipment to detect and reject those votes. In that test deck a different number of valid votes must be assigned to each candidate for an office, and for and against each question and issue so that the precinct based optical scanner tallies votes on each race and issue.
- Before tabulating the test deck of ballots on the selected precinct based optical scanners, the votes on each test deck must be tabulated and verified by hand count. The results from the hand count of the each deck must be recorded, and a hand counted summary of all votes in all races and questions or issues for which voting machines are tested must be tabulated, verified and announced before tabulating the test decks on the precinct based optical scanners.
- For counties using optical scan voting systems as their primary voting system, each test deck must include ballots voted on AutoMark voting machines or any other ballot marking device used by voters needing assistance and that are programmed with the same ballots as the precinct based optical scanners.

- The pre-audited test deck must be voted on a representative sample of precinct based optical scan voting machines, as determined by the board of elections.
- Once the test decks have been voted, summary statements must be generated by each precinct based optical scan voting machine, and the results must be announced for each unit. The results from the summary statements must then be compared to the hand counts, and each must match that count.
- The memory cards must be removed from the precinct based optical scan voting machines and the results then uploaded from each card to the central tabulation system in order to produce a “test count” report for each card, and total “test count” report for the server, accumulating the totals for each precinct based optical scanner. The accumulated totals shall equal for each race or issue the number of votes totaled from the manual hand counts for each race or issue, and in the case where the candidate or issue is programmed for multiple precinct based optical scan voting machines, those votes must equal the accumulated total of votes for those candidates or issues for all ballots in the test decks and tabulated and verified by hand count and as can be cumulated from the summary reports that were generated.
- A “test count” report of votes that were uploaded to the central tabulation system shall then be printed from the central tabulation system. The “test count” results from the central tabulation system shall then be announced.
- The results of the pre-audited group of test deck ballots, the summary statements generated from the precinct based optical scanners tested and the “test count” results from the central tabulation server must then be compared and must match.
- If any error/discrepancy in any of these results is detected, the cause for the error must be determined and corrected, and another test must be conducted. Testing must continue until an errorless test is conducted from start to finish, even if this requires additional public testing days.
- If no errors/discrepancies in results are detected, a “closing zero count” report shall be generated from the central tabulation system by the tester to verify there are no votes currently recorded on the system.
- A “closing zero count” report shall be generated from each precinct based optical scan voting machine tested to verify there are no votes currently recorded on any machine tested.
- After the board of elections completes the public testing of the vote tabulation system, all components, including the server, shall be secured until Election Day. In the case of precinct based optical scanners used for in person voting, they shall be secured before and during use on Election Day, until transport to the board of elections after the election. In the case of precinct based optical scanners used for central scanning and tabulation of absentee ballots, they shall be secured before and during use for pre-election scanning of absentee ballots (no tabulation) and through election night tabulation (also known as the unofficial canvass). Boards shall maintain and observe all possible board office and voting system server and machine security protocols during this time.

Conducting a Public Test of Direct Recording Electronic Voting Machines used for In Person Voting Before or On Election Day

- An “opening zero count” report must be generated from the central tabulation server by the tester to verify there are no votes currently recorded on the system.
- An “opening zero count” report must be generated from each of a representative sample of DRE voting machines by the tester to verify there are no votes currently recorded on the individual vote tabulating machines.
- As outlined in R.C. 3506.14(B), a set of ballot voting instructions specific to each precinct or precincts for which a DRE voting machine has been programmed, with separate instructions for at least ten (10) entire voted ballots to be voted on each machine, must be created for each voting machine tested. Multiple testers may be used to perform the voting functions during this phase of the test. Each set of ballot voting instructions must include a predetermined number of votes for each candidate and on each question and issue so that a different number of votes must be assigned to each candidate for an office, including write-in candidates, if any, and for and against each question and issue so that the DRE voting machine tallies votes on each race and issue.
- Before voting on the DRE voting machines from the sample set of ballot voting instructions, the votes from the ballot voting instructions must be tabulated and verified by hand count, and a hand counted summary of all votes in all races and on all questions or issues for which voting machines are tested must be tabulated, verified and announced before tabulating from the voting instructions for the precinct based optical scanners. The results from the hand count of the ballot voting instructions must be recorded and announced before tabulating the vote from the voting instructions on the precinct based optical scanners.
- The pre-audited sets of ballot instructions must be voted on a representative sample of DRE voting machines, as determined by the board of elections.
- Once the all sets of ballot voting instructions have been voted, summary statements must be generated by each DRE voting machine, and the results must be announced for each unit. The results from the summary statements must then be compared to the hand counts, and each must match that count.
- The memory cards must be removed from the DRE voting machines and the results then uploaded from each card to the central tabulation system in order to produce a “test count” report for each memory card, and total “test count” report for the server, accumulating the totals for each DRE voting machine. The accumulated totals shall equal for each race or issue the number of votes totaled from the manual hand counts for each race or issue, and in the case where the candidate or issue contest is programmed for multiple precinct DRE voting machines, those votes must equal the accumulated total of votes for those candidates or issues for all ballots in the sets of voting instructions and tabulated and verified by hand count and as can be cumulated from the summary reports that were generated.
- A “test count” report of votes that were uploaded to the central tabulation system shall then be printed from the central tabulation system. The “test count” results from the central tabulation system shall then be announced.

- The results of the pre-audited group of sets of voting instructions, including accumulations, the summary statements and their accumulations generated from the DRE voting machines tested and the “test count” results from the central tabulation server must then be compared and must match.
- If any error/discrepancy in any of these results is detected, the cause for the error must be determined and corrected, and another test must be conducted. Testing must continue until an errorless test is conducted from start to finish, even if this requires additional public testing days.
- If no errors/discrepancies in results are detected, a “closing zero count” report shall be generated from the central tabulation system by the tester to verify there are no votes currently recorded on the system.
- A “closing zero count” report shall be generated from each of the DRE voting machines tested to verify there are no votes currently recorded on the machines.
- After the board of elections completes the public testing of the vote tabulation system, all components, including the server, shall be secured until Election Day. In the case of DRE voting machines, they shall be secured before and during use for in person absentee voting and/or for use on Election Day, until transport to the board of elections after the election. Boards shall maintain and observe all possible board office and voting system server and machine security protocols during this time.

Conducting Pre- and Post-Tabulation Tests for a Central Tabulation Server for the Unofficial and the Official Canvasses of Votes

In accordance with R. C. 3506.14(B), each board of elections shall test automatic tabulating equipment just prior to and just after the tabulation of ballots to ascertain that the central tabulation system will accurately count the votes cast for all offices and on all questions and issues.

Because the test is to demonstrate the accuracy of the central tabulation system, a set of ballots (test decks and/or memory cards with previously printed results for DRE or precinct based optical scanner for which tabulation has been observed and for which all four board members have affixed their signatures to both an “opening zero count” reports and summary reports generated by the DRE or precinct based optical scan voting machines) should be assembled and/or prepared and should contain races with multiple candidates, candidate rotations, splits within a precinct, multiple questions or issues within a precinct and, if applicable, write-in candidates.

The following procedures must be observed for the pre- and post-tabulation testing of the central tabulation server, which must occur for both the unofficial and the official canvass of votes in an election. The board should arrange to have testers conduct the test who are familiar with the central tabulation server. The board should also ensure the testers are available for questioning prior to and after the actual testing of the system. They should be prepared to discuss details and explanations of the tests with the board members attending the test.

- An “opening zero count” report must be generated from the central tabulation server by the tester to verify there are no votes currently recorded on the system. This “opening zero count” report must be verified by all four board members who shall then affix their signatures to the “opening zero count” report.

- A “test count” report of votes that were uploaded to the central tabulation server shall then be printed from the central tabulation server. The “test count” results from the central tabulation server must then be announced. This “test count” report must be verified by all four board members who shall then affix their signatures to the “test count” report.
- The results of the pre-audited group of test deck ballots and/or memory cards, the summary statements generated by the voting machines (DRE or Optical Scan), and the “test count” results from the central tabulation server must then be compared and must match.
- If any error/discrepancy in the results is detected, the cause for the error must be determined and corrected, and another test must be conducted. Testing must continue until an errorless test is conducted. Equipment must not be used to tabulate actual voted ballots unless and until an errorless test has been conducted.
- If no errors/discrepancy in results is detected, a “closing zero count” report must be generated from the central tabulation server by the tester to verify there are no votes currently recorded on the system. This “closing zero count” report must be verified by all four board members who shall then affix their signatures to the “opening zero count” report.
- A “closing zero count” report shall be generated from the voting machine (DRE or Optical Scan) by the tester to verify there are no votes currently recorded on the machine. This “opening zero count” report must be verified by all four board members who shall then affix their signature to the “closing zero count” report.

The board must conduct successful tests on the central tabulation system on four occasions:

- Before tabulating ballots for an unofficial count on election night,
- After tabulating ballots for an unofficial count on election,
- Before tabulating ballots for an official count, and
- After tabulating ballots for an official count.

Conducting this testing, including using testers with ample knowledge of the voting system assures greater accuracy of testing and improves public confidence in the voting system in use in your county. If you have any questions, please contact an Elections Division administrator at 614-466-2585.

Sincerely,

Jennifer Brunner