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MEMORANDUM

DATE: August 1, 2018

TO: Wisconsin County Clerks
Milwaukee County Election Commission

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SUBJECT: County-Level Post-Election Audit Options following Partisan Primary

INTRODUCTION

The Wisconsin Elections Commission has received inquiries from various clerks and members of the public requesting permission and guidance with respect to conducting optional post-election audits of election results as part of the county canvass process. Commission staff has prepared the following memo confirming the counties' ability to conduct such optional audits and providing some suggested steps, methods and timelines for the upcoming Partisan Primary, if your time and resources allow.

With the use of electronic voting equipment becoming more common, and the recent attention given to efforts to interfere with elections in the United States, there has been increasing public demand to ensure that votes have been accurately counted. To that end, various calls have been made to implement safeguards against election hacking, tampering, and inconsistencies. A post-election audit is a tool that could be implemented to confirm that results have been tabulated accurately prior to certification. It is important to note that these optional audit procedures are separate from the mandatory voting equipment audit that is required to be conducted after each General Election.

Local election officials in Wisconsin take great effort to ensure that voting is carried out fairly, freely, and with integrity. Pre-election logic and accuracy testing (the "public test") is already conducted prior to the election by all municipalities, with an opportunity for the public to observe. Additionally, under Wisconsin law, all voters' selections are captured on either a paper ballot or a voter verified paper audit trail (VVPAT). See Wis. Stat. § 5.91(18). For those voters who cast their votes on electronic voting equipment, the equipment generates a complete permanent paper record

showing all votes cast by the voter. This paper record is reviewable by the voter before they leave the voting area. These efforts help to instill confidence in the integrity of the election both before Election Day and throughout the voting period. Post-election audits are another tool that could help increase voter confidence in the process.

Post-election audits may help the public to have the opportunity to have the same level of confidence in local election officials and boards of canvass that the WEC has with respect to election results. Post-election audits will showcase the accuracy with which votes are counted in Wisconsin. In the unlikely event that the post-election audit reveals a discrepancy or error, mistakes in the tabulation/counting votes process can be identified and corrected prior to the certification of election results.

OPTIONAL AUDIT PROCEDURES

Interested counties may pilot a post-election audit for the August 14, 2018 Partisan Primary. Commission staff has determined that post-election audits of the election results may be conducted prior to certification of the canvass. If an optional post-election audit is conducted, the County Board of Canvass should take care to secure ballots and other election materials in the event of a recount and ensure that a detailed chain of custody log has been generated.

We recommend one of the two types of audits outlined on the following pages. The following preparations and suggestions are common to both types of post-election audits regardless of which type(s) you choose:

Preparation

1. The post-election audit should be **conducted as part of the county canvass** to identify any discrepancies.
2. The post-election audit may occur regardless of whether votes were cast with paper ballots, electronic voting equipment, or a combination of the two. If a reporting unit with a DRE was selected for audit, the VVPAT should be used for the audit of those results.
3. Prepare to carefully document each step of the audit and canvass in the minutes.
4. It is important to understand that the audit is based on voter intent. Wis. Stat. § 7.50(2) provides that “All ballots...shall be counted for the person or referendum question for whom or for which they were intended, so far as the electors’ intent can be ascertained...” The voter’s intent should be respected, even if there is failure to properly follow instructions. If the County Board of Canvass determines there is a discrepancy, it is to determine if the discrepancy is due to voting equipment interpretation. It may not be necessary for the BOC to reconvene if the county can determine the source of discrepancy.

Selection

1. The county should randomly select at least two (2) municipalities by random means to be audited. For example, put all municipality names on equal size pieces of paper and draw from a hat. This selection can take place on the day of the canvass or before by staff (in the

- event the county wishes to include the selected municipalities on the canvass meeting notice or invite the municipal clerk to observe).
2. If the municipality has only one reporting unit, that entire municipality will be selected. If there are multiple reporting units, randomly select one of the reporting units (for example, by drawing numbers from a hat) and that individual reporting unit will be subject to audit. If fewer than 10 ballots were cast in that reporting unit, randomly select a different reporting unit, if possible (to preserve voter anonymity).
 3. [If a Partisan Primary] Randomly select either Republican Party or Democratic Party (for example, by drawing out of a hat or flipping a coin).
 4. Randomly select a race from the pool of all contested races on the ballot.
 5. Repeat steps 3 and 4 for each reporting unit selected for audit.
 6. The County Board of Canvass selects the type of audit to be conducted for each reporting unit and may use either audit method depending on the total ballots cast and the margin between the winner and second-place finisher for the contest selected.
 7. Once the two reporting units and contests have been determined for audit, proceed with auditing by one of the recommended audit methods below.

Finally, if your county has in the past or chooses to utilize post-election audits for the Partisan Primary, we would love to hear from you. Please provide feedback on the process, the recommended methods below, and any suggestions for improvement. The Wisconsin Elections Commission has requested that staff provide recommendations for post-election audit options at its September 2018 meeting and would appreciate your feedback. Please provide comments to the Elections HelpDesk at elections@wi.gov. We understand that the County Canvass is quickly approaching and that your situation may not allow for implementation of this post-election audit option in the short timeframe before the canvass. However, you may wish to begin contemplating how a post-election audit could be implemented in the future. Thank you for your thoughtful consideration and your ongoing efforts to keep Wisconsin elections secure. If you are considering conducting a post-election audit or are interested in audit training, please contact the Elections HelpDesk.

METHOD 1: Full-Hand Tally of Selected Reporting Unit

Pros: Most complete review of all ballots

Cons: More labor intensive

Brief Overview:

1. Identify the ballot box or bag containing the selected reporting unit's ballots.
2. Document the number on the tamper-evident seal in the audit minutes and then break the seal to open the bag.
3. The canvass board begins counting the ballots using the tally sheets provided by the WEC.
4. The final tally should match the election results provided by the municipality.
5. If it is possible for the board of canvass to resolve any discrepancy, it may. If not, under Wis. Stat. § 7.60(3) (returns that are informal or defective) those ballots can be sent back to the MBOC to remedy defects in the returns.
6. Repeat the above steps for each reporting unit selected.
7. The audit is complete.

Recommended Audit Procedures

Overview

1. At least two people review each ballot.
2. Auditors should review the stacks of ballots (1-100, 101-200, etc.) one stack at a time. The auditors may wish to review each ballot together to ensure consensus (or quickly identify any disagreement) on the interpretation of each ballot.
3. Keeping the stacks in order allows the auditors to narrow down and locate where there are discrepancies between the two independent counts instead of needing to tally all the ballots over and over again.

Set-Up

1. Count out ballots into sets of 100.
2. Label stacks (1-100, 101-200, 201-300, etc.)

Reviewing the Ballots

1. Tally contests from ballots that have been separated into groups of 20 – the goal is to be able to narrow discrepancies between individual tallies down to the smaller groups of 20.
 - a. Record the number of votes for each candidate on the tally sheet under the appropriate column for the group of ballots you are working on. (See Sample Post-Election Audit Tally Sheet, attached.)
 - b. List the total votes for each office by counting down the column for the stack of 20 you are working on. Be sure to include any scattering¹ or undervotes in your total. The total for each group of ballots should always be equal to the total number of ballots in the group (i.e. a group of 20 ballots should have a total of 20 votes, scattering and

¹ Scattering are any names written in on a write-in line that are not eligible for counting. To determine which write-in candidates are eligible for counting and which are not, please refer to the Counting Votes Manual.

undervotes, and a group of 17 ballots would have 17 total votes, scattering and undervotes)

2. Keep separated in subgroups of 20 while tallying – it is helpful to keep the group of 100 in one stack but to alternate the directions of the subgroups of 20 ballots.
3. Add subtotals after each stack of 100 ballots is complete and note that number in the ‘ST’ column of the Tally section.
4. Complete the ‘Totals’ section of the tally sheet by listing the hand-count subtotals in the ‘Audit’ column, the totals from the voting equipment results tape (or original hand count) in the “RR” column and noting any difference between those totals in the ‘Variance’ column.
5. Repeat 1-4 in sets of 100 until all ballots are counted.
6. After any discrepancies are reconciled, add the stack totals together to determine the total vote in each contest audited.
7. Return ballots to ballot bag/box, place new tamper-evident seal, and record the tamper evident seal serial number in minutes.

Audit Completion

1. If the tally is the same as the reported results from the municipality, proceed with the canvass as usual using the municipality’s reported results.
2. If a minor discrepancy is found in a county, state or federal office, the County Board of Canvass may adjust the results and proceed with the audit.
3. If “any of the returns received are so informal or defective that the board cannot intelligently canvass them, they shall dispatch a messenger to deliver the returns back to the municipal board of canvassers with written specifications of the informalities or defects and command them to immediately complete the returns or remedy the defects in the manner required and deliver them to the messenger. Every messenger shall safely keep all returns, show them to no one but the municipal clerk and board of canvassers and deliver them to the county clerk with all possible dispatch. To acquire the necessary full returns and remedy any informalities or defects the county board of canvassers may adjourn not longer than one day at a time nor more than 2 days in all.” *See Wis. Stat. § 7.60(3)*

METHOD 2: Risk Limiting Audit: “Ballot Polling” Method

Pros: Less labor intensive

Cons: Mathematical calculations involved, may progress to a full hand tally if election result is close

A Risk Limiting Audit (RLA) is a form of audit that is less labor intensive than a full hand tally. This option may be preferable if you have randomly selected a large reporting unit for audit and the margin is not extremely close. We propose using a “ballot polling” RLA method, which takes a random sample or “poll” of the results and compares it to the reported results from the municipality.

The method outlined below is the DiffSum method, which is a simplified version of a ballot polling risk limiting audit². It is a check to confirm that the number of votes in the random sample for the reported winner is greater than the number for the reported loser. The formula accounts for a “risk limit,” which may be chosen. The “risk limit” is the largest chance that the audit will fail to correct an incorrect outcome by not progressing to a full hand tally. The DiffSum method uses the following formula: $(a - b)^2 > c (a + b)$, where:

A = number of votes for winning candidate in the sample,

B = number of votes for losing candidate in the sample,

C = 1 + number of digits in the total number of votes cast in that reporting unit (if there were 100 votes cast, C=4, because there are three digits in the total number of votes cast).³

Let’s assume in a race for mayor a reporting unit with 100 votes cast was selected for audit, and there are 55 votes for candidate A and 45 for candidate B. Select a sample size based on the number of total ballots in that reporting unit. We recommend a minimum sample size of 10% of total ballots cast or 20 ballots, whichever is greater. Note: the smaller the sample you choose, the greater likelihood additional sampling will be needed. For a reporting unit containing 100 ballots, we will sample 20 ballots at a time. Let’s assume 15 ballots are drawn for candidate A and 5 ballots are drawn for candidate B and we choose of margin of error of 15% (and therefore we use 4 as the factor C because $1+3=4$). Risk limit values range anywhere from 0% (a full hand tally) to 20% depending on the type of audit conducted and the desired risk. For the ballot polling method selected, we recommend a risk limit of 15%, as described above.

Again, the equation is $(a - b)^2 > c (a + b)$.

Substituting the actual results, we determine whether $(15 - 5)^2 > 4 (15 + 5)$?

The result is $100 > 80$ and the number on the left side of the formula is larger than the one on the right. Accordingly, the reported results of the election are confirmed with a 15% error rate (risk limit). If a smaller risk limit is desired, the formula result will be different and may not confirm the reported election results (see footnote 2, below).

² Rivest, Ronald L. DiffSum – A Simple Post-Election Risk-Limiting Audit. 10 May 2018, arxiv.org/pdf/1509.00127.pdf.

³ The 1 is the number used in this calculation if you want a 15% risk limit/margin of error. Use 2 for a risk limit of 10% or 3 for 6%.

Recommended Audit Procedures:

1. Identify the ballot bag/box for the targeted reporting unit, note the tamper evident seal in the minutes, and break the seal.
2. Decide on the risk limit, as outlined above.
3. Count the number of ballots and choose a sample size based on the number of total ballots.
4. Shuffle the ballots so they are randomized. In the case of DRE voting equipment, the VVPAT is used as the ballot and some other method of randomization may be used.
5. After ballots have been shuffled, separate the number of ballots from the top of the pile to be audited.
6. Auditors should go through the selected ballots and record the votes on the tally sheet.
7. Once the selected ballots have been tallied, input the numbers into the formula $(a - b)^2 > c (a + b)$.
8. If you are auditing a race with more than two candidates, use only the reported winner and the second-place candidate in the formula.
9. If the left side of the formula is greater than the right side, the reported results are confirmed and the audit stops.
10. If the left side is not greater than the right side, the results have not yet been confirmed and additional ballots must be sampled.
11. If the audit must continue you may proceed one of the following ways:
 - continue sampling ballots one at a time and importing the combined results into the formula, until results have been confirmed per the formula;
 - continue sampling another batch of ballots (i.e. another 20 ballots) and then import combined results into the formula. Continue this process until results are confirmed or a full hand tally is completed.
 - switch over to a full hand tally of the reporting unit.
12. Return ballots to ballot bag/box, place new tamper-evident seal, and record the tamper evident seal serial number in minutes.

Audit Completion

1. If the reported result is confirmed by the formula, proceed with the canvass as usual using the municipality's reported results.
2. If the RLA proceeds to a full hand tally and a minor discrepancy is found in a county, state, or federal office, the county board of canvass may adjust the results and proceed with the audit.
3. If "any of the returns received are so informal or defective that the board cannot intelligently canvass them, they shall dispatch a messenger to deliver the returns back to the municipal board of canvassers with written specifications of the informalities or defects and command them to immediately complete the returns or remedy the defects in the manner required and deliver them to the messenger. Every messenger shall safely keep all returns, show them to no one but the municipal clerk and board of canvassers and deliver them to the county clerk with all possible dispatch. To acquire the necessary full returns and remedy any informalities or defects the county board of canvassers may adjourn not longer than one day at a time nor more than 2 days in all." *See Wis. Stat. § 7.60(3)*

As you may have observed, the ballot polling audit can save time and resources if there are a large number of ballots in the reporting unit and the margin is not extremely close. However, if the margin is close and/or the number of ballots is small (i.e. less than 100) a full hand-tally may not require a significantly greater effort and will include all ballots.