

Rule 25. Post-election audit

- 25.1 Definitions. As used in this rule, unless stated otherwise:
- 25.1.1 “Audit Center” means the page or pages of the Secretary of State’s website devoted to risk-limiting audits.
 - 25.1.2 “Audited contest” means a contest selected by the Secretary of State for a risk-limiting audit. The audited contest determines the number of ballot cards that must be examined and verified during the RLA.
 - 25.1.3 “Ballot cards” means the individual pieces of paper that together constitute a single ballot containing all of the contests an elector is eligible to vote. For example, a ballot consisting of a single piece of paper with content printed on the front or the front and back contains one ballot card, and a ballot consisting of two pieces of paper with content printed on the front and back of the first page and the front or front and back of the second page contains two ballot cards.
 - 25.1.4 “Ballot polling audit” means a type of risk-limiting audit in which the audit board examines and reports to the Secretary of State voter markings on randomly selected ballot cards seeking strong evidence that the reported tabulation outcome is correct.
 - 25.1.5 “Comparison audit” means a type of risk-limiting audit in which the audit board examines and reports to the Secretary of State voter markings on randomly selected ballot cards, then compares them to the voting system’s tabulation as reflected in the corresponding cast vote records.
 - 25.1.6 “Reported tabulation outcome” means the presumed winning and losing candidates or voting choices of a ballot contest as reflected in preliminary results.
 - 25.1.7 “Risk limit” means the largest statistical probability that an incorrect reported tabulation outcome is not detected and corrected in a risk-limiting audit.
 - 25.1.8 “Risk-limiting audit” or “RLA” means a post-election audit of votes on paper ballot cards and VVPAT records, conducted in accordance with section 1-7-515, C.R.S., and Rule 25.2, which has a pre-specified minimum chance of requiring a full hand count if the outcome of a full hand count would differ from the reported tabulation outcome.
 - 25.1.9 “RLA tabulation” means the tabulation of all in-person and accepted mail ballots cast by electors registered in the county, and any accepted provisional and property owner ballots that the county opts to include on the ninth day after election day.
 - 25.1.10 “RLA Tool” means the software and user interfaces provided by the Secretary of State in order to conduct RLAs.
- 25.2 Risk limiting audit. The designated election official must conduct a risk-limiting audit in accordance with section 1-7-515, C.R.S. and this rule.
- 25.2.1 RLA methods
 - (a) Counties that use a voting system capable of exporting CVRs must conduct a comparison audit.

- (b) Counties that use a voting system incapable of exporting CVRs must conduct a ballot polling audit.

25.2.2 Preparing for the audit

- (a) Risk limit. No later than 32 days before election day, the Secretary of State will establish and publish on the Audit Center the risk limit(s) that will apply in RLAs for that election. The Secretary of State may establish different risk limits for comparison audits and ballot polling audits, and for audits of statewide and countywide contests. In comparison audits the risk limit will not exceed five percent for statewide contests, and ten percent for countywide contests.
- (b) Audit board. No later than 15 days before election day, the designated election official must appoint an audit board to conduct the risk-limiting audit. The audit board must consist of electors nominated by the major political party county chairpersons. The designated election official must give written notice to the county chairpersons of their obligation to nominate audit board members and may designate appropriately affiliated electors as audit board members if one or both county chairpersons fail to do so in a timely manner. At least two canvass board members must observe the RLA, and members of the canvass board may serve as members of the audit board. The designated election official, members of his or her staff, and other duly appointed election judges may assist the audit board in conducting the audit. To the extent practicable, the audit board should not consist of individuals who participated in ballot resolution or adjudication during the election being audited. Each member of the audit board must take the election judge oath.
- (c) Ballot manifest. The county must maintain an accurate ballot manifest in a form approved by the Secretary of State.
 - (1) In the case of centrally counted paper ballots, the ballot manifest must uniquely identify for each tabulated ballot the scanner on which the ballot is scanned, the ballot batch of which the ballot is a part, the number of ballot cards in the batch, and the storage container in which the ballot batch is stored after tabulation. The county must secure and maintain in sealed ballot containers all tabulated ballots in the batches and order they are scanned. The county must maintain and document uninterrupted chain-of-custody for each ballot storage container.
 - (2) In the case of paper ballots scanned on polling location scanners, and electronic ballots cast on DREs, the ballot manifest must uniquely identify the device on which the ballot is cast or tabulated, the number of ballots or ballot cards cast or tabulated on the device, and the storage container or location in which the paper ballots or VVPAT is stored. The county must maintain and document uninterrupted chain-of-custody for each polling location scanner, DRE, and VVPAT, and all ballots cast on an individual polling location scanner or DRE must constitute a single batch.
- (d) RLA tabulation. On the ninth day after election day, the county must finish tabulating all in-person and accepted mail ballots cast by voters registered in the county. The county may but is not required to include in the RLA tabulation any provisional ballots and property owner ballots that have been verified and accepted on or before the ninth day after election day. Immediately after completing the RLA tabulation, and to the extent permitted by its voting system, the county must also generate and preserve:

- (1) A summary results report, showing overvotes, undervotes, blank-voted contests, and valid write-in votes;
 - (2) A results file export suitable for uploading to the Secretary of State's election night reporting system; and
 - (3) A CVR export.
- (e) CVR export verification. Counties conducting a comparison audit must verify that:
- (1) The number of individual CVRs in its CVR export equals the aggregate number of ballot cards reflected in the county's ballot manifest as of the ninth day after election day; and
 - (2) The vote totals for all choices in all ballot contests in the CVR export equals the vote totals in the summary results report for the RLA tabulation.
 - (3) After verifying the accuracy of the CVR export, the county must apply a hash value to the CVR export file using the hash value utility provided by the Secretary of State.
- (f) Comparison audit uploads. No later than 11:59 p.m. MT on the ninth day after election day, each county conducting a comparison audit must upload:
- (1) Its verified and hashed ballot manifest, and the ballot manifest's hash value, to the RLA tool;
 - (2) Its verified and hashed CVR export, and the CVR export's hash value, to the RLA tool; and
 - (3) Its RLA tabulation results export to the Secretary of State's election night reporting system.
- (g) Ballot polling audit uploads. No later than 11:59 p.m. MT on the ninth day after election day, each county conducting a ballot polling audit must submit or upload:
- (1) Its verified and hashed ballot manifest, and the ballot manifest's hash value, by email to the Secretary of State's office;
 - (2) Its cumulative tabulation report, by email to the Secretary of State's office; and
 - (3) Its RLA tabulation results export to the Secretary of State's election night reporting system.
- (h) Random seed. The Secretary of State will convene a public meeting on the tenth day after election day to establish a random seed for use with the Secretary of State's RLA tool's pseudo-random number generator based on Philip Stark's online tool, *Pseudo-Random Number Generator using SHA-256*. This material is incorporated by reference in the Election Rules and does not include later amendments or editions. The following material incorporated by reference is posted on the Secretary of State website and available for review by the public during regular business hours at the Colorado Secretary of State's office: *Pseudo-Random Number Generator using SHA-256* available at

<https://www.sos.state.co.us/pubs/elections/VotingSystems/riskAuditResources.html>. The Secretary of State will give public notice of the meeting at least seven calendar days in advance. The seed is a number consisting of at least 20 digits, and each digit will be selected in order by sequential rolls of a 10-sided die. The Secretary of State will randomly select members of the public who attend the meeting to take turns rolling the die, and designate one or more staff members to take turns rolling the die in the event that no members of the public attend the meeting. The Secretary of State will publish the seed on the Audit Center immediately after it is established.

- (i) Selection of audited contests. No later than 5:00 p.m. MT on the Friday after election day, the Secretary of State will select for audit at least one statewide contest, and for each county at least one countywide contest. The Secretary of State will select other ballot contests for audit if in any particular election there is no statewide contest or a countywide contest in any county. The Secretary of State will publish a complete list of all audited contests on the Audit Center. The Secretary of State will consider at least the following factors in determining which contests to audit:
 - (1) The closeness of the reported tabulation outcome of the contests;
 - (2) The geographical scope of the contests;
 - (3) The number of ballots counted in the contests;
 - (4) Any cause for concern regarding the accuracy of the reported tabulation outcome of the contests;
 - (5) Any benefits that may result from opportunistically auditing certain contests; and
 - (6) The ability of the county clerks to complete the audit before the canvass deadline.

- (j) Number of ballot cards to audit. The Secretary of State will determine the number of ballot cards to audit to satisfy the risk limit for the audited contests based on the ballot manifests submitted by the counties. The number of ballot cards to audit will be determined according to the formulas and protocols published by Mark Lindeman and Philip B. Stark in *A Gentle Introduction to Risk-limiting Audits*, as applied in Philip Stark's *Tools for Comparison Risk-Limiting Election Audits*, and *Tools for Ballot-Polling Risk-Limiting Election Audits*. These materials are incorporated by reference in the election rules and do not include later amendments or editions of the incorporated material. The following materials incorporated by reference are posted on the Secretary of State website and available for review by the public during regular business hours at the Colorado Secretary of State's office:
 - (1) Mark Lindeman and Philip B. Stark, *A Gentle Introduction to Risk-limiting Audits*, IEEE Security and Privacy, Special Issue on Electronic Voting, (Mar. 16, 2012), at <https://www.sos.state.co.us/pubs/elections/VotingSystems/riskAuditResources.html>.
 - (2) Philip B. Stark, *Tools for Comparison Risk-Limiting Election Audits*, (Feb. 26, 2017), at

<https://www.sos.state.co.us/pubs/elections/VotingSystems/riskAuditResources.html>.

(3) Philip B. Stark, *Tools for Ballot-Polling Risk-Limiting Election Audits*, (Feb. 16, 2017), at <https://www.sos.state.co.us/pubs/elections/VotingSystems/riskAuditResources.html>.

(k) Random selection of ballot cards for audit. The Secretary of State will randomly select the individual ballot cards to audit. The Secretary of State will use a pseudo-random number generator with the seed established under subsection (h) of this Rule to identify individual ballot cards as reflected in the county ballot manifests. The Secretary of State will notify each county of, and publish on the Audit Center, the randomly selected ballot cards that each county must audit no later than 11:59 p.m. MT on the tenth day after election day.

25.2.3 Conducting the audit

(a) The audit board must locate and retrieve, or observe the location and retrieval by county election staff, each randomly selected ballot card or VVPAT record from the appropriate storage container. The audit board must verify that the seals on the appropriate storage containers are those recorded on the applicable chain-of-custody logs.

(1) In counties conducting comparison audits, the audit board must examine each randomly selected ballot card and report the voter markings or choices in all contests using the RLA Tool or other means specified by the Secretary of State. If supported by the county's voting system, the audit board may refer to the digital image of the audited ballot card captured by the voting system in order to confirm it retrieved the correct ballot card randomly selected for audit. If the scanned ballot card was duplicated prior to tabulation, the audit board must retrieve, compare, and report the markings on the original ballot card rather than on the duplicated ballot card. The audit board must complete its reports of all ballot cards randomly selected for audit no later than 5:00 p.m. MT one business day before the canvass deadline.

(2) In counties conducting ballot polling audits, the audit board must examine and report the voter markings or choices in only the audited contest on each randomly selected ballot card in a form approved by the Secretary of State. If supported by the county's voting system, the audit board may refer to the digital image of the audited ballot card captured by the voting system in order to confirm it retrieved the correct ballot card. If a randomly selected ballot card was duplicated prior to tabulation, the audit board must retrieve, compare, and report the voter markings in the audited contest from the original ballot card rather than the duplicated ballot card. The audit board must complete its reports of all ballot cards randomly selected for audit no later than 5:00 p.m. MT one business day before the canvass deadline.

(b) The audit board must interpret voter markings on ballot cards selected for audit in accordance with the Secretary of State's Voter Intent Guide. If the audit board members cannot unanimously agree on the voter's intent, they must indicate that in the appropriate contest in the RLA tool's audit board user interface.

- (c) To the extent applicable, the Secretary of State will compare the audit board's reports of the audited ballot cards to the corresponding CVRs and post the results of the comparison on the Audit Center. The RLA will continue until the risk limit for the audited contests is met or until a full hand count results. If the county audit reports reflect that the risk limit has not been satisfied in an audited contest, the Secretary of State will randomly select additional ballots for audit.

25.2.4 Concluding the audit. No later than the third business day following the expiration of the deadline to request a recount under section 1-10.5-106(2), C.R.S. or the completion of any recount, whichever is later, a county that conducted a comparison audit must review its CVR file and redact voter choices corresponding to any ballot card susceptible to being personally identified with an individual voter before sending it to the Secretary of State, as required by section 24-72-205.5(4)(b)(iii), C.R.S.

25.2.5 The Secretary of State may, by order, alter any of the requirements outlined in Rule 25.2.

25.3 Random Audit. If the Secretary of State waives the requirement to conduct an RLA under section 1-7-515(2)(b), C.R.S., the designated election official must conduct the random audit mandated by sections 1-7-509(1)(b) and 1-7-514, C.R.S., in accordance with this rule.

25.3.1 Selected voting devices

- (a) No later than 48 hours after the close of polls on election night, the Secretary of State must notify the designated election official of the voting devices randomly selected for audit, based on the submitted hardware inventory list referred to in Rule 11.2.
- (b) The Secretary of State will randomly select, from the voting devices used in the election, at least five percent of the central count ballot scanners; at least one ballot scanner used at a polling location; and five percent of DREs.

25.3.2 The designated election official must appoint an audit board to conduct the post-election audit in accordance with section 1-7-509(1)(c), C.R.S. At least two canvass board members must observe the random audit. The designated election official, members of his or her staff, and other duly appointed election judges, may assist with the audit.

25.3.3 Number of ballots to audit

- (a) Paper ballots tabulated on ballot scanners. The board must audit at least 500 ballots or 20 percent of the ballots tabulated on each selected ballot scanner, whichever is less. The board may audit more than the minimum number of ballots required.
- (b) Electronic ballots tabulated on DREs. The board must audit all ballots tabulated on the selected DREs.

25.3.4 Conducting the audit

- (a) Paper ballots tabulated on ballot scanners
 - (1) If the voting system is capable of generating batch-level tabulation reports for a selected ballot scanner, the board must randomly select a number of ballot batches tabulated on the ballot scanner that, in the aggregate, contain the minimum number of ballots to be audited. The board must manually verify that the votes on the ballots contained in

each randomly selected batch match the voting system's tabulation of votes for that batch.

- (2) If the voting system is not capable of generating batch-level tabulation reports for a selected ballot scanner, the board can choose to audit all of the ballots that were tabulated on the selected scanner, or randomly select and rescan the minimum number of ballots to be audited. If the board chooses to rescan the minimum number of ballots, the board also must:
 - (A) Reset the selected ballot scanner's results to zero and generate a zero report;
 - (B) Rescan the randomly selected ballots for audit and generate a tabulation report from the selected ballot scanner; and
 - (C) Manually verify that the votes on the randomly selected ballots match the tabulation report for those ballots generated from the selected ballot scanner.
- (b) Ballots tabulated on DREs. The board must examine the VVPAT record of each selected DRE and manually verify that the votes reflected on the VVPAT match the tabulation report.

25.3.5 If the board discovers discrepancies during the audit, the board must:

- (a) Confirm that the manual count of the votes contained in the audited ballots is correct;
- (b) Confirm that the manual count of the votes contained in the audited ballots properly reflects overvotes, stray marks on the ballot, and other indications of voter intent;
- (c) Determine whether any discrepancy is attributable to a damaged ballot; and
- (d) Take any other action necessary in accordance with the canvass board's powers as described in Part 1, Article 10 of Title 1, C.R.S.

25.3.6 The designated election official must report the results of the audit in writing to the Secretary of State by 5:00 p.m. on the last day to canvass. The audit report may be submitted by mail, fax, or email. The audit report must contain:

- (a) The make, model, and serial number of the voting devices audited;
- (b) The number of ballots originally counted on each device or the number of ballots audited;
- (c) The count of the specific contests on the summary report printed at the close of polls and the report generated for the audit;
- (d) The count of the specific contests as manually verified;
- (e) Any other information required by section 1-7-514, C.R.S.; and

- (f) The signatures of the audit board, the canvass board members who observed the audit, and the designated election official.

25.3.7 The designated election official must segregate and seal the materials used during the post-election audit, including all tabulation reports, the audited ballots, and the audit report.

25.4 Removal and replacement of audit board members. The county clerk may remove for cause any member who fails or refuses to perform any of the functions he or she is charged with under these Rules. If the county clerk removes an audit board member for cause, he or she must notify the Secretary of State and consult with the county chairperson of the removed member's political party to appoint a replacement.