Minutes of RLA Walkthrough Webinar – January 8, 2017 10:30 am MST

1. Welcome to attendees
2. Conceptual overview of risk limiting audit
   a. Two types of risk-limiting post-election audits
      i. Comparison audits – conducted by counties utilizing new tabulation systems capable of exporting ballot-level cast vote records (CVRs)
      ii. Ballot polling audits – conducted by counties utilizing older tabulation systems that are not capable of exporting CVRs
      iii. Currently, RLA software is used by state to administer and appropriate counties to conduct comparison audits only
   b. Ballot tabulation and RLA overview for comparison audit counties:
      i. 32 days before election: Secretary establishes risk limits for comparison and ballot polling audits
      ii. 22 days before election: First date that counties can send mail ballots to active electors
      iii. 15 days before election: First day that counties can start counting (tabulating) ballots
         1. Colorado election model: ~95% of voters vote by mail ballot, and ~5% vote in-person at vote centers
         2. Central count: All counties centrally tabulate ballots. In-person ballots are transported to central count facility for tabulation
         3. Ballot manifests:
            a. During tabulation, counties must independently maintain a ballot manifest in .csv format, showing for each batch of tabulated ballots, the ballot scanner ID, batch ID, number of ballot cards in batch, and the location where the batch is stored following tabulation.
            b. The total number of ballot cards tabulated per the county's ballot manifest should equal the total number of ballot cards reflected in the county's CVR file (discussed immediately below)
         4. CVRs:
            a. During tabulation, new voting systems capture all valid votes in all ballot contests on each individual ballot card in a CVR data file
            b. In Colorado, the CVR data file is exported from the voting system in .csv format
            c. Each row of the CVR file corresponds to an individual ballot card with a unique identifier, which is a concatenation of the ballot scanner ID – batch ID – ballot position within the batch. The total number of unique CVRs equals the total number of ballot cards counted in the county, which should equal the county's ballot manifest.
            d. The columns of the CVR file collectively represent every available voting choice in every ballot contest in the election,

whether or not a particular contest appears on a particular ballot card

     e. In the CVR file, a "1" in a voting choice field indicates a vote for that choice, a "0" indicates no vote for that choice, and a null value (empty field) indicates that contest/choice did not appear on that particular ballot card

iv. Election night: All counties export from voting system and upload to Secretary of State's Election Night Reporting system preliminary election results. These results are refreshed periodically on election night and thereafter as counties continue to tabulate more ballots, until the county certifies official results (13 or 17 days after the election, depending on the type of election).

v. 3rd day after the election: Secretary selects audited contests in each county by based on then-current ENR preliminary results

vi. 8th day after election: Last day for counties to receive military and overseas ballots, and for voters to cure any outstanding mail ballot deficiencies (missing or discrepant signatures)

vii. 9th day after election:
1. Counties must finish tabulating all timely received/cured ballots.
2. County audit administrators must upload to RLA tool ballot manifests and CVR files

viii. 10th day after election:
1. Secretary of State convenes public meeting to establish 20-digit random seed, through sequential rolls of 10-sided dice

ix. Secretary of State commences RLA in each comparison audit county by performing the following tasks in RLA software:
1. Entering comparison audit risk limit
2. Entering random seed
3. Selecting one or more audited contests in each county

x. RLA software then applies RLA algorithm and determines number of ballots necessary to satisfy the risk limit for the audited contest in each county
1. The number of ballots each county must audit is based on the risk limit and the diluted margin of the audited contest
2. The diluted margin is the margin of the audited contest divided by total ballot cards tabulated in the county.
3. The RLA software calculates diluted margin by extracting predicate data from the appropriate county's CVR file

xi. RLA software then randomly selects from all ballot cards cast in the county the individual ballot cards that each county audit board must audit, using SHA-256 pseudo-random number generator, seeded with random seed
1. Currently based on CVR data
2. Should be based on ballot manifest data

xii. 10th day after election and following:
1. Once state commences audit, RLA software generates for each county a list of the ballot cards randomly selected for audit.

2. County audit administrator logs into RLA software, downloads list of randomly selected ballots, and county audit board then locates and retrieves from their storage locations the randomly selected ballot cards
3. County audit administrator then launches RLA user interface for the county audit board
4. County audit board enters into RLA software's digital representation of each randomly selected ballot card all votes in all contests from the corresponding paper ballot card. Software generates the digital representation of the ballot card's content by examining the appropriate row of the CVR file
5. County audit board submits its report of valid votes on a randomly selected ballots one at a time. Once submitted, county audit board cannot go back to a previous ballot.
6. RLA software compares county audit board's report of votes on each randomly selected ballot card to the voting system tabulation of those votes as reflected in the CVR file
7. RLA software determines whether risk limit for audited contest is satisfied, depending on nature of any discrepancies between audit board report and CVR file
   a. If risk limit is satisfied, RLA in the county concludes
   b. If risk limit is not satisfied, software determines the number of additional ballots that must be examined in a subsequent round based on a different algorithm, and generates another list of randomly selected ballots for the second and subsequent rounds, until risk limit is satisfied or full hand count results.
3. Identify and discuss gaps in current RLA tool
   a. Current software allows the Secretary only to select one or more contests on a county for audit; the tool needs to allow selection of a statewide contest that appears on all ballots.
      i. There is a complication with this approach for ballots provided to property owners, but they form a very small proportion of ballots.
      ii. *Question from an attendee: You mention "appearing on all ballots", but in a primary election, since ballots are arranged by party, even for a statewide office, the ballot contests on the different party contests will be different.*
      iii. Response: True, no statewide contest will appear on every ballot in a primary election. For a statewide election, the tool must allow the Secretary to select a statewide contest for audit.
   b. Additional enhancements desired:
      i. The tool should be compatible with major commercial browsers
      ii. For county administrators, we would like them to be able to review the selected contest prior to launch of the audit
      iii. We would like the county audit board to be able to review each entered ballot as it is being entered for discrepancies to allow determination of source(s) of discrepancies at the time the ballot entry is made

      iv. We would like to allow multiple county audit boards to simultaneously proceed through audit activities

      v. We would like additional reporting capabilities in the tool

      vi. We would like the tool be able to capture the audit method of each county (i.e., hand count, comparison, etc.)

    c. Additional functional enhancements desired:

      i. Allow RLA of primary elections for statewide contests; the current tool is suited to county-level audits

      ii. Accommodate CVRs from the Clear Ballot system in addition to the Dominion system

        1. *Question from an attendee: Can the SoS share samples or specifications of CVRs from Clear Ballot?*

        2. Response: We have requested such for both primary and general elections from both Dominion and Clear Ballot. Please make this request in the Q&A scheduled for January 10, 2017, and we will provide CVR files for both Dominion and Clear Ballot.

    d. That concludes the content we have prepared for the presentation

4. Additional comments or questions:

    a. *Comment from attendee: Relative to the desire to provide real-time feedback on discrepancies through an additional review screen, the State Audit Group has consensus that <u>after</u> entry of ballot markings, the tool could initiate a discrepancy review procedure. The results of the initial review would be preserved, but it could allow real-time resolution of discrepancies in order to eliminate entry errors. This could also allow checking of the proper ballot if a completely wrong ballot was pulled instead of the proper randomly-selected ballot*

    b. *Comment from attendee: A minor point: the headings from the ballot manifest sample should exclude spaces, since that is not quite in line with the specification for a ballot manifest*

      i. Response: Please include in the January 10th Q&A session a request for the actual ballot manifest template. We will provide that to all interested parties.

    c. *Comment from attendee: it is an open question as to whether the random selection should be performed using the CVRs or the ballot manifest. One benefit of having both is to verify that CVRs and information from ballot manifests remain in-synch and verifiable against each other (to eliminate phantom ballots)*

    d. *Comment from attendee: another issue may be in providing CVRs timely to the public for their use in investigating issues with an RLA, while also minimizing issues with anonymity of CVRs*

      i. Response: No Colorado statute requires a state or county election official to provide unredacted CVRs and other predicate audit data to members of the public while the audit is underway and before the county canvass board certifies official results. Similarly, Colorado law simply does not require that members of the public have immediate access to all unredacted audit data in order to fully replicate or investigate a RLA, either during the RLA or after its conclusion. Due to the complexity of this development and the short development window, the

Secretary of State's office must focus its efforts and resources on developing the RLA Tool to satisfy existing statutory mandates so that counties can efficiently conduct statistically valid risk-limiting audits of any contest that appears on any county ballot in a future election, including statewide and multi-county contests.

5. Closed the session