



**Response to “Post-Election Audit Standards Working Group
Report – Evaluation of Audit Sampling Models and Options for Strengthening
California’s Manual Count”**

http://www.sos.ca.gov/elections/peas/final_peaswg_report.pdf

8/3/2007 by Kathy Dopp

The Secretary of State of California formed a post-election audit standards working group. On July 27th, 2007 this audit working group released a report and recommendations “Post-Election Audit Standards Working Group Report – Evaluation of Audit Sampling Models and Options for Strengthening California’s Manual Count”. The California audit working group claims, on page one of its report, that current election audit models do not address several vital problems with elections.

“Unfortunately, the statistical models that exist for determining the size of the random sample do not apply to California, because they require the random sample to be selected from the state as a whole. In California, cities, counties, and special districts draw independent random samples. These models do not currently take into account overvotes and undervotes, nor do they cover multi-winner elections. Moreover, the approaches that exist give confidence in the outcome of the election only if no discrepancies are found. Still lacking is a method that can determine whether to trust the outcome of the election when small discrepancies are found.”

To the contrary, in fact all of the problems mentioned in the above paragraph by the California post-election audit standards working group *are* solved by current election audit models.

1. **Claim:** "the current models" "do not take into account under-votes, over-votes"

Response: The California audit working group raises a good point because under-voters and over-votes can be incorrectly recorded. However, the solution is simple. Under-votes and over-votes are automatically taken into account if the vote share for candidates is calculated out of the total number of ballots cast, rather than the total number of votes counted. This calculation gives the correct margins and the correct election audit sample sizes that take into account that under-votes and over-votes may be incorrectly counted.

Dopp and Stenger in their “Election Integrity Audit” paper¹ have always recommended using the total number of ballots cast as a base for election audit calculations rather than the total number of votes cast. Here is an excerpt from p. 9 of their September 2006 paper:

When auditing precinct vote counts, the probability of detecting outcome-altering vote miscount is reduced if vote miscount is targeted in fewer large-sized precincts. To adjust for precinct-size variation we directly calculate the minimum number of corrupt vote counts that could alter outcomes using a list of the total number of ballots cast in precincts.²⁸ To adjust for precinct-size variation we need:

PrecinctSize = (n₀, n₁, ...) the total number of ballots cast in each precinct in which votes were cast for a race.

T = total number of ballots cast in the county for the particular race to be audited (T should be equal to the sum of the precinct sizes input above).

NEDA's correct recommendation is in contrast to other authors in this fieldⁱⁱ who recommend using calculations that do not correctly handle under-votes and over-votes.

2. **Claim:** "the current models" "require the random sample to be selected from the state as a whole" and do not solve the problem of audits in "races which overlap separate jurisdictions"

Response: The current models do not require the random samples to be selected from the state as a whole. The calculations should be done on a county level as recommended in our paper "Election Integrity Audit" by using the minimum margin of the county or state-wide margin and calculating the audits separately for each county. This passage from page 9 of "The Election Integrity Audit", September, 2006 explains how to audit on the county level:

Should State-Wide or County-Wide Margins between The Candidates Be Used? The state-wide margin determines the percentage of votes that could be wrongfully switched, on average, in each county to wrongfully alter the state-wide outcome. Therefore the amount of vote counts audited in each county needs to be sufficient to detect at least the amount of vote miscount that could have altered the state-wide margin. However, in order to determine if the outcome in each county is correct and to reduce the need for expanded audits when discrepancies are uncovered in other counties, each county should audit sufficient vote counts to validate the outcome in their county. Therefore, *whichever margin is less, the state-wide or the countywide margin, should be used to calculate the audit amount in each county* in order to make the audit process most efficient and informative.

Should State-Wide or County-Wide Total Number Of Vote Counts Be Used? *Audits should be conducted for any race in each county or township using $N =$ the total #vote counts within the county.* Although audits could be conducted with smaller sample sizes using the state-wide total number of vote counts, this could prolong the audit process by requiring expanded audits in all counties whenever discrepancies are found in any one county. If county-level audits are conducted initially, more information is obtained from the first round of audits to make determinations that could avoid unnecessary expanded audits in counties where no discrepancies are found during initial audits. County-wide audits could enable the election process to be more quickly completed [more quickly] to announce final election winners [election results].

3. **Claim:** "still lacking is a method that can determine whether to trust the outcome of the election when small discrepancies are found"

Response: We may determine whether to trust the outcome of the election by using the amount and type of the discrepancies found in the manual audit. There are six precisely calculable election audit discrepancy conditions which should trigger further investigation and correction of machine miscounts, or trigger escalation of manual audits or full manual recounts. I give two of them here:

- a. First, the formula for calculating election audit sample sizes assumes a fixed assumed maximum rate of wrongful vote shift which would not be immediately suspicious in any particular auditable machine vote count (for example 20%). Therefore if within one (or more) audited machine vote counts there is a net wrongful vote shift to a winning candidate of the assumed maximum rate (or more) then the election outcome is in doubt; and
- b. If the total rate of discrepancies (in the entire audit sample) wrongly switched (in the machine count) from a losing candidate to a winning candidate is equal to (or more than) $\frac{1}{2}$ the margin between the leading candidates; or the total discrepancies of uncounted

votes for a losing candidate is equal to (or more than) the margin between the losing candidate and a winning candidate, then the election outcome is in doubt. (uncounted votes count half as much as switched votes for the purpose of determining if the outcome is in question.)

There are three more similarly precise calculable reasons that should logically trigger escalation of an election audit because the outcome is in doubt which I will not describe here. There is also a condition that may not put the outcome in question but which should trigger further investigation, as described in the Brennan Center's recent auditing report which states that any "single unexplained discrepancy between the paper records and electronic tallies is a strong indication of a software problem of some kind" and is grounds for a later review of voting machine software systems and code, even if an election outcome is not in questionⁱⁱⁱ.

In addition, the California post-election audit standards working group claims that the previously agreed-upon premise of current election audit models, "*If the machine count named the wrong winner, what is the chance that we will detect that the machine outcome is incorrect?*" is incorrect, and claims that the correct way to frame the problem of election audits is:

"If the machine count named the wrong winner, what is the chance we would have seen more errors in the sample than we actually saw in the sample?"

Response: I assert that the overarching purpose for conducting manual election audits *is* to determine whether or not the election outcome is correct; and I do not understand the purpose of "the chance we would have seen more errors in the sample than we actually saw in the sample".

Claim: The CA SOS audit standards working group also states that current audit models do not solve the problem of "multi-winner" election races; or procedures for calculating escalated audit sample sizes when discrepancies are found which put an outcome in doubt. However, these problems are also easily solved by current audit protocols, but I shall not describe the solutions here.

For further assistance, please contact Kathy Dopp, kathy@electionarchive.org

The document is posted online at:

<http://electionarchive.org/ucvAnalysis/US/paper-audits/Response2CA-SOS-Audit-Report.pdf>

ⁱ <http://electionarchive.org/ucvAnalysis/US/paper-audits/ElectionIntegrityAudit.pdf>

ⁱⁱ On p. 15 in “Random Auditing of E-Voting Systems – How Much is Enough?” Stanislevic recommends using votes counted rather than ballots cast as a base for calculations. See <http://www.votetrustusa.org/pdfs/VTTF/EVEPAuditing.pdf> Stanislevic’s paper was released one month after Dopp publicly released her newly re-discovered formula [Saltman had first discovered it in 1978] for calculating the minimum number of vote counts required to alter election outcomes and other ideas on election audits to several mail lists, including those of the Open Voting Consortium and National Election Data Archive and after Dopp published a revised version of Dopp and Baiman’s paper “How Can Independent Paper Audits Ensure Election Integrity” http://electionarchive.org/ucvAnalysis/US/paper-audits/Paper_Audits.pdf Stanislevic, in contrast to Stenger and Dopp, recommends using the number of votes cast, rather than the number of ballots cast as a base for calculations, and Stanislevic stated in emails to Dopp that he believes that the number of votes, rather than number of ballots is the best way to calculate election audit sample sizes. Dopp disagrees with Stanislevic’s recommendations for the very reason cited by the California Post-election audit working group.

ⁱⁱⁱ "Post-Election Audits: Restoring Trust in Elections - Executive Summary" August 1, 2007 by Norden, Burstein, Hall, and Chen. http://www.brennancenter.org/dynamic/subpages/download_file_50109.pdf