

1 **Mandatory Vote Count Audit**  
2 **A Legislative & Administrative Proposal**

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4 Originally written in February 2006  
5 Revised in September 2006, and in December 2007 to March 2008, June and July and  
6 December, 2008  
7

8 Note: An abbreviated (10 page) version of this post-election auditing proposal that may be  
9 preferable to this version for legislative purposes is posted on-line at:  
10 <http://electionmathematics.org/ucvAnalysis/US/paper-audits/Vote-Count-Audit-Bill-2009.pdf>  
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13 **Acknowledgements**

14 Thanks to all the following: Joycelynn Strait helped to write the first drafts of this proposal in  
15 January and February 2006 specific for Utah. Ron Baiman and Frank Stenger co-authored  
16 election auditing papers with me in 2005 and 2006. Philip Stark and Ron Rivest reviewed this  
17 and made some suggestions to improve its definitions and procedures. Alice Steiner suggested  
18 some excellent revisions. Andy Bardwell urged me to generalize this proposal for use in any  
19 State and to add the formulas for the Probability Proportional to Margin Error Bound (PPMEB)  
20 method for calculating audit sample sizes. Utah Legal Counsel and Legislative Analyst Eric  
21 Weeks made helpful requests for more specificity. Utah Representative Neil Hansen agreed to  
22 sponsor it in the Utah House and thus encouraged me to do further work on it. Javed Aslam,  
23 Raluca Popa, Ron Rivest and Philip Stark derived the overall PPMEB election auditing  
24 methods into which I inserted the precise margin error bounds and included here. Utah's Alan  
25 McEwan, County Clerk/Auditor of Weber County; Julio Garcia, Election Director of Salt Lake  
26 County; and Sherrie Swensen, Salt Lake County Clerk, reviewed this proposal and made very  
27 helpful recommendations to make its audit procedures do-able for County Election Officials.  
28 Anthony Stevens, Deputy Secretary of State of New Hampshire, provided materials on  
29 efficient and effective methods for hand counting paper ballots, some of which are included in  
30 this proposal. Thanks to other volunteer election advocates who helped point out flaws and  
31 loopholes in other election auditing procedures used in some States in the U.S.

32  
33 **General Description:**

34 Voters, candidates, citizens and election officials want high confidence in the integrity of the  
35 election process by subjecting electronic vote counts to independent hand-counted audits; and  
36 by making reports available with which to evaluate rates of voter turnout, voting equipment  
37 allocation, under-votes, over-votes, spoiled ballots, voting equipment failure, absentee ballots,  
38 uncounted ballots, and provisional ballots. This bill requires routine independent audits of vote  
39 count accuracy and requires the release to vote count auditors of records and information  
40 necessary to verify the integrity of the vote count audits and to evaluate voter service levels.

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42 **Amend existing statute to extend the canvass period to 28 days.** [Note: The canvass period  
43 between Election Day and certification of election results should be 28 days to allow ample time for conducting  
44 vote count audits prior to certifying the election results – 28 days is a common canvass period in some states.]

45 The board of county canvassers shall meet to canvass the returns no later than 28 days after the  
46 election.

47

48 **Amend existing statute to require that all printed, unused, used, and spoiled ballots shall**  
49 **be retained for the 24 month federal preservation period.** [Note: All printed ballots must be  
50 reconciled or accounted for during the audit to be able to enable detection of evidence of ballot substitution,  
51 ballot box stuffing, and ballot tampering.]

52

53 [Note: This statute may replace current recount statutes because the mandatory post-election vote  
54 count audit sample size will automatically adjust up to a 100% (recount) whenever necessary to ensure  
55 that a very close election contest is decided accurately. Overall, in Utah's 2004 general election, 5% of  
56 the number of total auditable vote counts for federal and state-level election contests would have been  
57 audited in order to meet the confidence-level requirements of this statute.]

58

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## 60 **Section 1. Definitions.**

61 (a) "Auditable Election" means a regular primary election, regular general election, or the  
62 presidential primary.

63 (b) "Auditable Election Contest" means all election contests for a state or federal office, all  
64 state-wide ballot propositions; and all state, county, or municipal election contests for the  
65 position of an election official such as the county clerk's office.

66 (c) "Auditable Vote Count" means a tally of votes that is publicly reported for an auditable  
67 election contest obtained from counting a group of one or more ballots that are counted at one  
68 place and time or by one electronic voting device. Auditable vote counts can be precinct or  
69 polling location vote counts made by any voting system, including electronic voting devices,  
70 ballot marking devices, automatic tabulating equipment, optical scanning equipment, or hand-  
71 counted, or can be electronic voting device counts, or batches of ballots counted by hand or by  
72 automatic tabulating equipment where each vote count is associated with a number of ballots  
73 maintained as a group. A vote count may be an individual ballot if the voting system produces  
74 an auditable report of vote counts with humanly readable identifiers for individual ballots and  
75 preserves ballot privacy.

76 (d) "Auditable Vote Count Report" means a report that provides a reconciliation of the number  
77 of paper ballots that were ordered, printed, used, unused, and spoiled for each precinct or  
78 polling location and, for each auditable election contest, shows all unofficial auditable vote  
79 counts that were counted for each type of vote (including any absentee, early, early-  
80 provisional, Election Day, and Election Day-provisional votes) that were used to tally the  
81 current unofficial total. The type of vote counting system (such as central count optical scan

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82 paper ballots, DRE memory cards, precinct-based optical scan) and any vote counting device  
83 serial number for each device used to tabulate each unofficial vote count and the precinct or  
84 batch number and any state and federal congressional district identifiers for each vote count  
85 shall be included; plus the approximate number of any remaining uncounted ballots and the  
86 reasons why any uncounted ballots are not counted. The sum of all auditable vote counts  
87 shown in the auditable vote count report shall sum to the current unofficial results for each  
88 election contest at the time of the release of the auditable report.

89 (e) "Confidence-level" means 100% minus the maximum chance that an incorrect election  
90 outcome is certified. [Note: Certifying an election outcome at 95% confidence-level means  
91 that there is at most a 5% probability that an incorrect election outcomes that occurs would be  
92 incorrectly certified.]

93 (f) "Election Audit & Recount Committee" means the independent entity established to help  
94 develop, approve, and implement a plan to audit & recount auditable vote counts in every  
95 auditable election and to supervise and direct the vote count audit.

96 (g) "Election audit records" include pollbooks, electronic voting device and automatic  
97 tabulating equipment log and audit files, ballot definition files used by voting machines to cast  
98 or tally votes, voter-verifiable paper records, vote totals tapes, zero tapes, provisional ballots,  
99 unused ballots, memory cards, summary records created at the polling places or county  
100 election office, written procedures provided to poll workers and election judges, and all voter  
101 registration materials. Election audit records shall include written chain of custody and security  
102 procedures for regulating access to paper and electronic ballot records, electronic voting  
103 devices and automatic tabulating equipment, for voter registration materials, and other election  
104 audit records, including any logs containing signatures for documenting access and the reasons  
105 for it, or video records of surveillance cameras. Specific passwords and security keys shall be  
106 redacted.

107 (h) "Election Outcome" means the specific winners and losers of an auditable election contest.

108 (i) "Hand-count" means a counting of the votes, wherein the handling of the voter verifiable  
109 paper ballot records is done by human hand and the identification of each vote is determined  
110 by a visual inspection of said records by human beings.

111 (j) "Maximum possible margin error" means the number of cast ballots plus the difference of  
112 votes between the winner and the runner-up of an auditable election contest.

113 (k) "Percentage margin" means the difference in total reported votes between the winner and  
114 the runnerup of an election contest divided by the number of cast ballots that were eligible to  
115 vote in that election contest.

116 (l) "Random selection or random drawing" means that items are selected by using statistically  
117 valid probability sampling methods including simple random samples or stratified random  
118 samples.

119 (m) "Vote count audit" means an independent audit of all auditable elections and auditable  
120 election contests conducted by vote count auditors, following the procedures required by the  
121 Election Audit & Recount Committee, for the purpose of checking the accuracy of election

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122 outcomes by a method of randomly selecting auditable vote counts and comparing hand counts  
123 of all voter-verifiable paper ballot records associated with the selected auditable vote counts  
124 with the auditable vote counts.

125 (n) "Vote count auditor" means a person selected to conduct a vote count audit who meets the  
126 criteria determined by this statute and the Election Audit and Recount Committee.

127 (o) "Vote Count Audit Plan" means the published plan containing the rules, standards, policies,  
128 procedures, and methods developed by the Election Audit & Recount Committee for  
129 conducting vote count audits.

130 (p) "Vote Count Audit Report" shall consist of, for each auditable election contest, for each  
131 audited vote count:

- 132 1. A comparison of the hand counts obtained during the vote count audit and the  
133 auditable vote counts that were randomly selected from the auditable vote count report  
134 for each ballot type (provisional, early, mail-in, Election Day,...) along with any  
135 explanations for the discrepancies, and a description of the actions taken by the vote  
136 count auditors or election officials for resolving the discrepancies, and
- 137 2. The number of missing or damaged election audit records.
- 138 3. An evaluation of the ballot reconciliation procedures, ballot security and chain of  
139 custody procedures used in each county, along with any recommendations for  
140 remedying any weaknesses found in such security and reconciliation procedures.

141 (q) "Voter-verifiable paper record" means the following auditable records of votes cast:

- 142 a. A paper ballot marked by the voter for the purpose of being hand counted or read by  
143 automatic tabulating equipment;
- 144 b. A paper ballot marked by the voter to be mailed to an election officer, whether from  
145 a domestic or overseas location;
- 146 c. A paper ballot created through the use of a ballot marking device if, in each case, the  
147 record permits the voter to verify that the record is correct before the ballot is cast; or
- 148 d. A human-readable paper printout of the voter's vote produced by a touch screen or  
149 other electronic voting machine, or a voting device if, in each case, the record permits  
150 the voter to verify that the record is correct before the ballot is cast.

151 (r) "Voting system" means a collection of one or more electronic voting devices, voting  
152 machines, automatic tabulating equipment, ballot devices, and procedures which allows voters  
153 to view ballots, select candidates and cast votes, and that allows election officials to aggregate  
154 and tabulate the votes cast in an election.

155 \_\_\_\_\_

156 **Section 2. Vote Count Audits -- General Provisions.**

157 (1) For every auditable election, each county shall, in accordance with this statute and using a  
158 Vote Count Audit Plan approved by the Election Audit & Recount Committee, and under the  
159 direction and supervision of the Election Audit & Recount Committee or their designees,  
160 conduct a “vote count audit” of all auditable election contests after initial unofficial election  
161 results are tabulated and publicly released.

162 **Procedures** for vote count audit shall include:

163 a) **Voting Resources Allocation Report.** No later than noon on Election Day, each  
164 County Election Office shall submit to the State Election Audit & Recount Committee  
165 and to the State Election Office a list of voting machine serial numbers and the State  
166 Legislative districts in which each voting machine is deployed to record votes, and a  
167 list of any voting machine not deployed in the election.

168 b) **County Auditable Vote Count Reports & Auditing Locations:** As soon as possible  
169 after polls close and prior to the random selection of auditable vote counts to be  
170 audited, each county election officer shall submit to the State Election office, and  
171 publicly post, an auditable vote count report, and shall publicly post the location of the  
172 facility for the manual audit, along with a list of at least five dates prior to the official  
173 canvass date when the facility will be available for conducting the vote count audit.

174 c) **State Auditable Vote Count Reports** The State Election office shall compile a state-  
175 wide auditable vote count report which combines all auditable election contests from  
176 the individual county auditable vote count reports and publicly post its statewide  
177 auditable vote count report on its web site and submit a copy to the State Election Audit  
178 and Recount Committee.

179 d) **Publishing Audit Amounts & Time & Place of Random Selections** After receiving  
180 auditable vote count reports from county and state election officers, Election Audit &  
181 Recount Committee or its designees shall as soon as possible, determine and publicly  
182 publish the formulas and methods used to calculate the vote count audit amounts and  
183 shall publicly publish the audit amounts sufficient to verify each auditable election  
184 contest as specified in Section (2) and shall provide 24 hours public notice of the time  
185 and place of the public random selections of auditable vote counts and the times and  
186 locations of each county’s vote count audits.

187 e) **Random Selection of Auditable Vote Counts:** The Election Audit & Recount  
188 Committee or its designees shall in a publicly observable and understandable process,  
189 randomly select auditable vote counts to audit. If a spreadsheet or program is used, the  
190 public shall be able to observe the screen at close range during the process and a copy  
191 of the spreadsheet or program used shall be made publicly available. Ten-sided  
192 translucent dice or other publicly observable and understandable method of random  
193 selection may be used.

194 f) **Announce Random Selection Results** Immediately after randomly selecting auditable  
195 vote counts for audit, the Election Audit & Recount Committee or its designees shall  
196 provide to all county Vote Count Auditors, to all County Election Officials, and shall

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- 197 publicly post, a list of all the vote counts identified for manual auditing and the vote  
198 count audits shall begin immediately or within at most 24 hours afterwards.
- 199 g) **Ballot Record Access Prohibited** After the random selection of vote counts for audit  
200 and before the beginning of the manual audit it shall be prohibited for anyone,  
201 including election officials, to access or to handle any ballot records which have been  
202 counted and included in the auditable vote count report, except to transport the ballot  
203 records, in a publicly observable manner, from the location where ballots are stored and  
204 secured to the location of the manual audit. *[Note: This is necessary because election  
205 officials in some states were observed going through ballots selected for audit prior to the  
206 manual audit, putting the integrity of the audit in question.]*
- 207 h) **Auditors Reconcile Ballots & Voters** Vote count auditors shall reconcile that the  
208 number of unused, used, and spoiled ballots equals the number of printed ballots and  
209 that the number of ballots in each auditable vote count selected for audit is equal to the  
210 number of voters recorded as having voted in that auditable vote count. To reconcile  
211 the overall numbers of ballots, additional vote counts may be examined by vote count  
212 auditors.
- 213 i) **Audit Tally Sheet:** If more than one auditable election contest is audited at the same  
214 time, the tally sheet shall be organized in the same order as the ballot, with sections for  
215 each auditable election contest and question and the name of each candidate listed in  
216 the same order as they are listed on the ballot. There should be a space following each  
217 name/question for one of the counters to put a hash mark for each vote for that  
218 candidate/question. The tally sheet should have a space for the team to write in the  
219 total votes for each candidate, and the total skipped, defective, cancelled, and write-in  
220 ballots. A stack and count method may be used instead for counting individual paper  
221 ballots one auditable election contest at a time.
- 222 j) **Hand Counts:** Voter verifiable paper records selected for audit shall be hand counted  
223 in a publicly observable way prior to the final canvass. The public shall be able to  
224 observe the vote count audit at close range during the process. Auditors shall:
- 225 a. Rearrange the audit location for counting. All counting must occur where it is  
226 visible to members of the public who wish to observe. A video camera may be  
227 used to magnify the view of the ballot for public observers.
- 228 b. Identify all those who will be counting and swear them in.
- 229 c. Read the instructions for counting to all the auditors who will be counting.
- 230 d. Count the number of registered voters (including any who registered on  
231 Election Day) who are recorded as having voted.
- 232 e. For each vote count selected for manual auditing the election official shall make  
233 available the corresponding group of sealed paper ballot records or the journal  
234 tape take-up canister for each DRE paper roll and the Vote Count Auditors  
235 shall:
- 236 i. Examine the tamper evident seal

- 237                   ii. Note any evidence of tampering on a log provided by the election officer  
238                   for that purpose.
- 239                   iii. Ascertain the reasons for any evidence of tampering and record the  
240                   reasons on log provide by the election officer for that purpose.
- 241                   iv. Remove the tamper evident tape seal
- 242           f. Each tally team shall have at least two members who look at the paper ballots to  
243           determine the votes, and at least two members who look at the counts recorded  
244           by the team to verify their correctness. Unless a sort and stack counting method  
245           is used for counting individual paper ballots, each counting team shall include, a  
246           reader who should read off the name of the candidate (the word “yes” or “no”  
247           for questions) who received the vote on the ballot being counted, at least one  
248           marker who should make a hash mark beside that name on a tally sheet. If a  
249           voter has not voted for any candidate for a particular office the reader should  
250           state “skipped” and the marker should mark the “skipped” row for that office on  
251           the tally sheet. If the voter voted for two or more candidates for an office where  
252           the ballot instructs to vote for one the reader should read off “defective” and the  
253           marker should mark the “defective” row on the tally sheet. If the instructions are  
254           that a voter should vote for two and the voter voted for three or more, follow  
255           these same instructions. If a voter has cancelled the ballot, the reader should  
256           state “cancelled” and the marker should mark the “cancelled” row for that office  
257           on the tally sheet. If the voter wrote in a candidate, that name should be written  
258           in on the tally sheet.
- 259           g. If an observer wishes to protest how the tally team is counting a particular ballot  
260           he or she needs to do so at the moment in time when that ballot is being counted  
261           by the team.
- 262           h. Disputed ballots, where voter intention cannot be clearly determined, may be set  
263           aside and the number of disputed ballots included on the tally sheets
- 264           i. As each team completes its totals, the tally sheets should be turned in.
- 265           j. If discrepancies are found, the Auditors should investigate and attempt to  
266           resolve each discrepancy with the County Election Official.
- 267           k. The same vote counts selected for auditing auditable election contests may be  
268           used to manually audit other election contests that appear on the ballot at the  
269           discretion of counties.
- 270           l. Tally and record the total number of votes hand-counted for each ballot  
271           proposition and office, as well as the number skipped, defective, or cancelled on  
272           a log provided by the election officer for that purpose.
- 273           k) **Audit Logs:** A log shall be kept by auditors on a log form provided by the election  
274           officer for that purpose which shall

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- 275 i. Record the total number of votes, and skipped, defective, and cancelled  
276 ballots hand-counted for each auditable election contest.
- 277 ii. Note any differences between the hand-counted results and the auditable  
278 vote count report results.
- 279 iii. Ascertain the reasons for any differences between the hand-counted and  
280 the auditable vote count report results if possible and record the reasons.
- 281 iv. If applicable, note that an audited machine was used both in early voting  
282 and on Election Day.

283 If a machine identified for audit failed on Election Day and was replaced by another  
284 machine, the election officer shall audit both the replacement machine and, to the  
285 extent possible, the failed machine.

- 286 l) Log all the other information required in this section.
- 287 m) Each election officer shall make all audit logs and audit reports available for inspection  
288 by the board of canvassers and available as a public record; and transmit a summary of  
289 the audit logs to the State Election Office with the canvassers' reports and to the State  
290 Election Audit and Recount Office and preserve a copy with the election returns and  
291 voter registration records as required by federal statute.

292 **(2) Amount of Vote Count Audits:** Hand-counts of the voter-verifiable paper records  
293 corresponding to each auditable vote count shall be conducted such that:

294 (a) the state-wide vote count audit sample size shall provide that there shall be no more  
295 than a 5% chance that an incorrect election outcome would be certified or at least 95%  
296 confidence-level. The calculation for the state-wide vote count audit sample size for  
297 any election contest shall assume that at least 40% of the maximum possible margin  
298 error could have occurred within an auditable vote count. *[Note: A minimum audit  
299 sample size may be estimated for planning purposes by county election officials by  
300 taking a number of auditable vote counts equal to 1 divided by the percentage margin  
301 for each auditable election contest];* and <sup>1</sup>

302 (b) at least 1% (one per centum) of auditable vote counts in which any votes are cast in  
303 each auditable election contest shall be audited; and

304 (c) in addition to the randomly selected auditable vote counts in a) and b) above, if at  
305 least one auditable vote count has not been selected for each auditable election contest  
306 in each county in which the auditable election contest occurs then one auditable vote  
307 count shall be randomly selected for auditing from within each of such missed counties  
308 for each auditable election contest; and

309 (d) in addition to the randomly selected auditable vote counts in a), b), and c) above,  
310 two discretionary auditable vote counts may be selected for audit by the leading

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57 <sup>1</sup> Note: See <http://electionmathematics.org> Election Audit section for more information. Election audit efficiency  
58 can be improved if voting systems are developed which are auditable at the individual machine or ballot levels.  
59 This is one reason why a Election Audit & Recount Committee should be permitted to approve alternative  
60 election audit procedures in the future.

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311 runnerup for any state-wide election contest and one discretionary auditable vote count  
312 may be selected for audit by the leading runner-up for any other auditable election  
313 contest by its leading runnerup.

314 [Note: *The intent is to make sure that at least one vote count for each auditable election contest is*  
315 *audited in each county. Vote counts which calculations show are "suspicious" as compared to prior*  
316 *elections or to partisan voter registration or partisan turnout, can be selected by candidates for audit.*<sup>2</sup>]

317 **(3) Vote count auditor access to election audit records:** Each election officer shall make  
318 available to vote count auditors during the audit:

- 319 a. Written procedures for between-election, pre-election, during election, and post-  
320 election chain of custody and security procedures for the security of voting  
321 equipment, and also for the security of paper ballots and paper voter registration  
322 and election audit records. Specific passwords and security keys shall be redact-  
323 ed, and
- 324 b. written procedures provided to poll workers and election judges, and
- 325 c. ballot definition files used by voting machines to cast or tally votes, and
- 326 d. voter verifiable paper ballot records of vote counts selected for the audit, and
- 327 e. poll books and precinct reconciliation records, and
- 328 f. electronic and paper voter registration records, and
- 329 g. records of absentee ballots and provisional ballots requested by, provided to,  
330 and mailed back by voters, including those ballots counted and not counted, and
- 331 h. computerized voting equipment log and audit files, and
- 332 i. unused, used, and spoiled ballots and electronic ballot records, and
- 333 j. any summary records of votes or ballots, and
- 334 k. any addendum to the initial auditable vote count report submitted to the State  
335 Election Office and to the State Audit & Recount Committee office containing  
336 any changes to the number of counted and uncounted ballots and votes, with the  
337 reasons for the changes documented.

338 **(3) Exceptions to Election Audits for Certain Auditable Election Contests:** A vote count  
339 audit shall not be required of a particular auditable election contest under this subtitle if

- 340 a. the winning candidate in the election had no opposition on the ballot; or
- 341 b. if a 100% manual recount has been, or will be, conducted of the same auditable election  
342 contest, or
- 343 c. if there is a percentage margin of at least 70% in an auditable election contest and there was  
344 a percentage margin of at least 70% for the same candidate in the same auditable election  
345 contest in the most recent prior audited election.

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69 <sup>2</sup> Note: Calculation of "suspicious" precincts could assume for instance, that at most a 20% vote shift per precinct  
70 or batch vote count is not suspicious and compare the partisanship of voters to the partisanship of election results  
71 in the current and prior audited elections as recorded in voter history files to determine vote counts having more  
72 than a 20% shift, or another measure could be used for the upper limit of the amount of vote miscount that  
73 could occur in any one auditable vote count. See Appendix G in [http://electionarchive.org/ucvAnalysis/US/paper-](http://electionarchive.org/ucvAnalysis/US/paper-audits/History-of-Election-Auditing-Development.pdf)  
74 [audits/History-of-Election-Auditing-Development.pdf](http://electionarchive.org/ucvAnalysis/US/paper-audits/History-of-Election-Auditing-Development.pdf)

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346 (4) **Certification of Election Results:** Neither the State Election Office nor any county may  
347 canvass or certify the results of any auditable election contest which is subject to a vote count  
348 audit under this subsection prior to the completion of the vote count audits and the  
349 announcement and publication of vote count audit reports as proscribed the Election Audit &  
350 Recount Committee.

351 -----

352 [Note: *The intent is to audit the state's election results **independently** of the state election office. The State*  
353 *Auditor is an appropriate choice for overseeing a committee that must develop and implement auditing rules and*  
354 *regulations that are given the full weight of law and includes processes of chance wherein vote count shall be*  
355 *chosen for an audit using probability sampling methods and qualified vote count auditors may be chosen to*  
356 *manually examine vote counts using probability sampling methods ]*

357 -----

### 358 **Section 3. State Election Audit & Recount Committee**

359 (1) The State Auditor's Office shall:

360 (a) within thirty (30) days of the date this statute is signed into law, notify appropriate  
361 organizations to appoint members for and accept appointments for members of the  
362 State Election Audit & Recount Committee (E.A.R.C.). The E.A.R.C. shall consist of at  
363 least seventeen (17) members who may serve a maximum of (2) two (4) four-year  
364 terms in any (10) ten-year period, none of whom shall be or were:

365 (i) a member of the State's Voting Equipment Selection Committee or State  
366 Help America Vote Act Plan Committee on Election Reform; or

367 (ii) an owner, employee or sub-contractor of a voting system company, or  
368 voting system service company, or voting system supply company; or

369 (iii) working for any political candidate's campaign or ballot proposition.

370 (b) ensure that the E.A.R.C. committee members include:

371 (i) four members who shall have at least a Master's Degree in mathematics or  
372 statistics and be appointed by the chair persons of the four largest university and  
373 college **mathematics or statistics** departments in the State, all of whom shall  
374 be invited to appoint someone to serve on the committee; and

375 (ii) three members who shall have at least a Master's Degree in **computer**  
376 **science or computer engineering or computer security**; appointed by the  
377 chair persons of the three largest university or college computer science  
378 departments in the State, all of whom shall be invited to appoint someone to  
379 serve on the committee; and

380 (iii) three members appointed by chair persons of the three largest university or  
381 college government **political science** departments in the State, all of whom shall  
382 be invited to appoint someone to serve on the committee, and

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- 383 (iv) two members who are **financial auditors** appointed by the State's Chief  
384 Auditor,
- 385 (v) three **political party** members appointed by the chair persons of the three  
386 State political parties that garnered the most votes in the State in the last federal  
387 election, all of whom shall be invited to appoint someone to serve on the com-  
388 mittee,
- 389 (vi) four members who are appointed by the trustees of grassroots nonprofit  
390 **election rights or open government organizations** in the State and who have  
391 served in a prior election as an election judge or poll worker,
- 392 (vii) at least four non-voting members who are **county election officers**,  
393 appointed by the association of county election officials;
- 394 (viii) one non-voting member appointed by the State Election Office; and
- 395 (ix) one **attorney with expertise in election law** appointed by the State  
396 Attorney General's Office to serve as a non-voting member of the committee to  
397 give advice on the legality of the operations of and any rules and regulations  
398 proposed by the E.A.R.C.
- 399 (c) ensure that the organizations which are qualified to appoint State E.A.R.C. members  
400 are notified and E.A.R.C. members are appointed at least forty-five (45) days prior to  
401 the second Monday in January in each auditable election year, and arrange for space,  
402 teleconference and other facilities for E.A.R.C. meetings and to meet E.A.R.C.  
403 requirements; and publicly publish any reports submitted by the E.A.R.C.

404 [Notes: *Although input from county and state election offices is necessary for coordination (and*  
405 *therefore county elections officers are included as members) voting system insiders should be*  
406 *kept to a minimum in order to reduce the possibility of a conflict of interest. The size of*  
407 *university and college departments shall be determined by the number of total students, staff, &*  
408 *faculty currently in the department.*]

409 (2) Compensation for the E.A.R.C.

- 410 (a) A member of the committee who is not a government employee may receive up to  
411 \$50/hour up to \$5,000 compensation per each auditable election year for compensation  
412 and benefits for the member's services, and may also receive per diem and expenses  
413 incurred in the performance of the member's official duties at the rates established by  
414 the appropriate State statute or agency. This amount may be adjusted annually for  
415 inflation by whatever method the state uses to adjust for inflation.
- 416 (b) A member may decline to receive compensation or per diem and expenses for the  
417 member's services.
- 418 (c) A state government officer or employee member who does not receive salary, per  
419 diem, or expenses from the member's agency for the member's service may receive per  
420 diem and expenses incurred in the performance of the member's official duties at the  
421 rates established by the appropriate State statute or agency.

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422 (d) A state government officer or employee member may decline to receive per diem  
423 for the member's service.

424 *[Note: There may be significant work required of some members, especially in the first auditable*  
425 *election cycle after this legislation is passed.]*

426 (3) The State Auditor shall fill any vacancies that occur on the committee between terms,  
427 following the guidelines herein.

428 (4) The State Auditor's offices shall provide staffing for the committee.

429 (5) Terms of Office: The members of the E.A.R.C. shall have four year terms with half of its  
430 initial members having at most one four year term during the first five years. *[Note: In other*  
431 *words, at least half its initial members shall not be reappointed for a second four year term at the end*  
432 *of the first four year term.]*

433 -----

434 **Section 4. Election Audit & Recount Committee (E.A.R.C.)**  
435 **Responsibilities**

436 (1) The E.A.R.C. shall meet at least ten times during auditable election years. *[Note: Meetings*  
437 *may be via teleconference.]*

438 (2) The E.A.R.C. shall develop, evaluate, and update a Vote Count Audit & Recount Plan  
439 (VCAR Plan) that includes:

440 (a) a uniform format for reporting initial election data for the county and state-auditable  
441 vote count reports; *[Note: Standard XML/OASIS EML (Election Markup Language) is*  
442 *recommended and is currently being used by California and is loved by press.]*

443 (b) a method or methods for determining vote count audit sample sizes that meets the  
444 requirement of this statute;

445 (c) a method or methods for making random selections or random drawings of vote  
446 counts to audit. The selection may be proportional to the amount of maximum possible  
447 margin error within each auditable vote count. Each auditable vote count shall have a  
448 nonzero chance for selection;

- 449 (d) rules, standards, policies, procedures and processes for conducting vote count audits  
450 according to the requirements of this statute;
- 451 (f) a method or methods to appoint a chief independent auditor to oversee each county's  
452 election audits;
- 453 (g) a method or methods to select vote count auditors and to assign vote count auditors  
454 to manually count specific auditable vote counts;
- 455 (h) a uniform format for auditing forms and for vote count audit reports, and
- 456 (i) methods for analyzing vote count audit discrepancy results in order to decide  
457 whether or not to certify the election or to expand the audit sample size that meets the  
458 requirements of this statute, accounting for the vote count audit sample size calcula-  
459 tions.
- 460 (2) The E.A.R.C. shall publicly publish the VCAR Plan and provide for a period of at least one  
461 month of public review and comment on it before approving, publishing and implementing the  
462 VCAR Plan before each auditable election.
- 463 (3) The E.A.R.C. is authorized to coordinate with the State Elections Office, State Auditor's  
464 Office, County Election Officials and with vote count auditors.
- 465 (4) The E.A.R.C. shall decide whether to expand the audit sample size or to certify an election  
466 contest for each auditable election contest.
- 467 (5) The E.A.R.C. shall publicly publish a report evaluating the efficacy and efficiency of  
468 election audits within 90 days following each auditable election, and shall advise the State  
469 Election Office and the State Legislature of any problems or recommendations to reduce vote  
470 count errors or to improve voting and election systems.
- 471 (6) The E.A.R.C. shall advise the State Election Office and County Election Officials by  
472 evaluating the auditability of new voting systems considered for purchase.
- 473 (7) The E.A.R.C. or its designees shall be available during the vote count audits to consult with  
474 election officials or vote count auditors regarding issues that arise.
- 475 (8) The E.A.R.C. shall advise the State Election Office on request for proposals (RFP) for  
476 voting system studies or purchases and on contracts with any voting and election system  
477 providers including providers of voter registration, pollbook, vote-casting or counting systems
- 478 (9) The E.A.R.C. shall be subject to State open records and meetings laws.

479  
480

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## 481 **Section 5. Random Selection of Vote Counts to Audit**

482 The Election Audit and Recount Committee (E.A.R.C.) shall determine and publicly announce  
483 the method of conducting the random drawings or random selections, at least 30 days before  
484 the election. The random drawings or selections shall occur after the polls close and after each  
485 county has publicly posted an auditable vote count report of its unofficial vote counts. Vote

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486 counts audited under this subdivision shall be selected according to standards and procedures  
487 required by this statute and developed by the E.A.R.C. that are announced in advance to the  
488 public and the drawings shall be open to the public. The random selection of vote counts for  
489 the mandatory vote count audit shall be made by a publicly observable method by the E.A.R.C.  
490 or its designees.

491 -----

## 492 **Section 6. Requirements for Selection of Vote Count Auditors**

493 The county election official shall determine the procedure for selecting the vote count auditors,  
494 subject to any requirements made by the E.A.R.C. Vote count auditors shall *not* include any:

- 495 (a) employee or official of any county election official's office or anyone who  
496 administered the auditable election,
- 497 (b) employee or elected official from the State Election office,
- 498 (c) employee or officer of any entity that designs, manufactures, or services a voting  
499 system or supplier of any voting system used in the State,
- 500 (d) person who maintains or has special access to the voting system that a voter would  
501 not normally have, prior to, or during the auditable election,
- 502 (e) person who acted as a poll worker or an election judge during the same auditable  
503 election, or
- 504 (f) person serving in any position on any political campaign committee of any  
505 candidate for political office or working for groups supporting propositions.

506 -----

## 507 **Section 7. Public Notice, Access & Disclosure Requirements**

- 508 1. A state-wide auditable vote count report shall be made publicly available by the State  
509 Election office, as soon as possible after polls close and before the random selection of  
510 auditable vote counts for auditing. Any addendums to the initial auditable vote count  
511 report to include ballots cast by absentee voters, absent uniformed services voters, and  
512 overseas voters, and votes cast by provisional ballots shall likewise be made publicly  
513 available before the random selections of those auditable vote counts.
- 514 2. The amount of the manual audits shall be noticed prior to the random selections. The  
515 notice shall include the expected number of recount teams that will be used [so that the  
516 candidates have the opportunity to bring an appropriate number of representatives to  
517 watch each recount team, and the election officials can plan for adequate staffing].
- 518 3. The date, time and location of the random selections of vote counts to be audited and  
519 the dates, times, and places of the manual vote count audits shall be noticed at least one  
520 day (twenty-four hours) before the random selection is conducted.
- 521 4. As soon as practicable after the completion of a vote count audit and analysis  
522 conducted under this subsection, the vote count auditors shall announce and publish the

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523 vote count audit report. The vote count audit report shall be prepared by the vote count  
524 auditors, signed and forthwith filed with the elections officer, the state Election Audit  
525 and Recount Committee Office, the State Auditor's Office, and the State Election  
526 Office and shall be made publicly available on the Internet. The audit report and the  
527 audit log and audit reconciliation sheets shall be open to public inspection and may be  
528 used as prima facie evidence of a discrepancy in any contest arising pursuant to the  
529 election statutes.

530

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531 **Section 8. Audit All Vote Types**

532 The voter-verifiable paper records of votes cast at the precinct or equivalent location on or  
533 before the date of the auditable election, other than provisional ballots, shall be hand counted  
534 by vote count auditors and those recorded hand counts compared with the auditable vote count  
535 report for those auditable vote counts.

536 The voter-verifiable paper records of votes cast other than at the precinct or equivalent location  
537 on or before the date of the auditable election, including votes cast by absentee voters, absent  
538 uniformed services voters, and overseas voters, and votes cast by provisional ballot at the  
539 precinct, shall be hand counted by the vote count auditors and those recorded counts compared  
540 with an auditable vote count report of those ballots.

541 All ballots that are cast in an auditable election contest shall be reported in an auditable vote  
542 count report. No auditable vote count shall be randomly selected for auditing until after it is  
543 publicly reported as part of an auditable vote count report.

544

-----

545 **Section 9. Additional Audits If Cause Shown**

546 If the auditors are unable to reconcile the hand count with the electronic vote tabulation, then  
547 the E.A.R.C. with the assistance of County Election Officials and the State Election Official  
548 shall initiate or conduct such further investigation of the discrepancies as may be necessary for  
549 the purpose of reviewing whether or not to certify the election results, or expand the vote count  
550 audit sample size, and may order a re-canvass in accordance with the provisions of the election  
551 code.

552 If any voter-verifiable, paper record is found to have been damaged or missing, then the  
553 damaged or missing records shall be assumed to be discrepant with the auditable vote counts as  
554 reported in the auditable vote count report, and a tabulation of any such damaged and missing  
555 paper records will be duly recorded, and an explanation sought.

556 In the event of any inconsistencies or irregularities between any electronic records and the  
557 voter-verifiable paper records, the paper records shall be the true and correct record of the  
558 votes cast, except in the case where evidence exists that indicates that the paper record has  
559 been tampered with or damaged, in which case, if an outcome is in question, a court will  
560 decide.

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561 If the amount of discrepancies or errors discovered during a vote count audit are judged by the  
562 E.A.R.C. to exist in insufficient amounts to produce an incorrect election outcome, then  
563 additional vote count audits may be performed after the certification of the election results at  
564 the discretion of County Election Officials or the State Election Office.

565 If vote count auditors find sufficient discrepancies, due to any cause, between the initial  
566 auditable vote count reports and the hand-count vote count audit tallies, then the E.A.R.C. shall  
567 randomly select and administer hand counts of additional auditable vote counts as considered  
568 appropriate to resolve any concerns about the accuracy of an election outcome resulting from  
569 the audit until the election outcome can be certified according to the requirements of this  
570 statute.

571 -----

## 572 **Section 10. Time Table for Audit Process**

- 573 1. By noon on Election Day, all election officers shall provide a list of the number of pre-  
574 printed ballots ordered and available for each precinct, and a list of all voting and election  
575 machinery and their corresponding serial numbers, along with any corresponding precinct  
576 identifiers and congressional districts that the machinery will be used for, and a list of  
577 available voting machinery that is not being used.
- 578 3. Within 48 hours after polls close on Election Day, County Election Officials shall submit an  
579 auditable vote count report of detailed auditable vote counts that have been used to tally the  
580 initial results reported thus far in each election contest to the State Election Office, to the  
581 Election Audit & Recount Committee, and publicly post it.
- 582 4. Within 36 hours of receiving the initial auditable vote count reports from all counties, the  
583 State Election Office shall publicly post a state-wide auditable vote count report and provide  
584 a copy to the State Election Audit and Recount members.
- 585 5. Within 36 hours of receiving a state-wide auditable vote count report, the E.A.R.C. shall  
586 determine and then announce how many auditable vote counts shall be audited for each  
587 auditable election contest and the expected values for audit sample sizes for each county, and  
588 publicly post this information and inform county election officials and vote count auditors.  
589 The E.A.R.C. and the State Election Office shall at the same time publish a public notice,  
590 including in a prominent place on the State Elections Office website, giving at least 24 hours  
591 (1 day) advance notice of the date, time and place, including street address, building and  
592 room number, of the public random drawings of auditable vote counts, and the dates, times  
593 and places, including street address, building and room number of the public hand vote  
594 counts audits.
- 595 6. The E.A.R.C. or its designees shall conduct public random drawings to determine which  
596 auditable vote counts in each county will be audited.
- 597 7. On the same day, immediately following the random drawing, election officers and auditors  
598 shall begin the publicly observable vote count audit of all voter-verifiable paper ballot  
599 records associated with the vote counts selected for auditing. Election officers and auditors

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- 600 shall plan to conduct the initial vote count audit with sufficient auditors to complete the hand  
601 counts and other verifications within 96 hours (4 days) of when audits are initiated.
- 602 10. As soon as practicable after the completion of a vote count audit conducted under this  
603 statute, the county shall announce and publish its vote count audit report.
- 604 11. **Deadline for completion of audits:** The counties shall complete the vote count audits and  
605 announce and submit their vote count audit reports to the E.A.R.C. The E.A.R.C. shall  
606 submit its initial report to the State Election Office for publication of the information  
607 required under this section in time for the State Election Office to certify the results of the  
608 election and provide for the final determination of any controversy prior to the deadline  
609 described in section 6 of the title 3, United States Code.

610

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611 **Section 11: County Election Official – Responsibilities for Vote**  
612 **Count Audits**

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613 County Election Officials or their official representatives shall:

- 614 (1) Remove any opaque plastic covers or any obstructions which obscure voters' view of  
615 sealed voter-verifiable machine-printed paper roll ballot records, and
- 616 (2) Include, in all instructions for voters on how to vote, instructions telling voters to  
617 review and verify the accuracy of any voter-verifiable paper ballots printed by any  
618 electronic voting device or ballot marking device, and
- 619 (3) Employ procedures that, in all cases, allow a voter to review and approve a human-  
620 readable paper record of the voter's ballot whenever an electronic voting device is used  
621 to cast a ballot. *[Note: Supplemental, provisional-type, ballots may be necessary to overcome*  
622 *the "three strikes you're out" DRE paper roll programming that casts a ballot that was not*  
623 *approved by the voter after two unsuccessful tries by the voter to create a matching paper*  
624 *ballot roll record; and to overcome the problem of DRE printers that malfunction during*  
625 *voting.], and*
- 626 (4) At least one month prior to Election Day in any election covered by this audit  
627 legislation, publicly post and provide to the State Election Audit and Recount  
628 Committee a set of written procedures for between-election, pre-election, during  
629 election, and post-election chain of custody and security procedures for the security and  
630 integrity of voting equipment and electronic election databases and materials, and also  
631 for the security of paper ballots and paper voter registration and election audit records,  
632 redacting specific passwords and security keys, describing how the public can  
633 participate in verifying these security procedures, and
- 634 (5) By noon on Election Day in any auditable election covered by this statute, provide a list  
635 of the number of precincts, along with the districts within each precinct, and a list of  
636 each electronic voting device, ballot marking device and automatic tabulating  
637 equipment to be used in the election, the serial numbers for each such vote-casting or  
638 counting machine, along with the precinct(s) and the congressional district(s) that each  
639 machine will handle, and a list of voting and election equipment not being used,
- 640 (6) Election Officials and their designees are Prohibited From printing any paper roll ballot  
641 records after Election Day that voters have not had an opportunity to verify. Such

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- 642 records may not replace any damaged or missing voter-verifiable paper roll ballot  
643 records, and
- 644 (7) Produce and publicly post auditable vote count reports, and
- 645 (8) Hire and train sufficient vote count auditors who will be under the supervision of the  
646 chief county vote count auditor, and
- 647 (9) Provide facilities and election audit records for conducting the vote count audits.  
648 Whenever suitable facilities are available, the audits shall be administered at the same  
649 location where the unused and used ballots in the election are stored and counted after  
650 the date of the election, and in the presence of those personnel who under statute are  
651 responsible for the custody of the ballots, and
- 652 (10) Publicly post notices required by this statute, and
- 653 (11) Have staff present during vote count audits and oversee ballot transport and security to  
654 and in the facility provided for the vote count audits, and
- 655 (12) Provide a method for members of the public to effectively observe the vote count audits  
656 and verify the integrity and accuracy of the audit, and
- 657 (13) Provide election audit records to auditors, and
- 658 (14) Work with vote count auditors to attempt to resolve and explain any discrepancies  
659 discovered during a vote count audit, and
- 660 (15) Produce a final, updated auditable vote count report that includes the absentee and  
661 provisional ballots within 16 days after Election Day.
- 662 (16) Not certify any election result until after the completion of the vote count audits and the  
663 public posting of the audit reports.
- 664

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## 665 **Section 12: Absentee and Provisional Ballot Auditing**

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- 666 1. The initial auditable vote count report shall be updated with an addendum that  
667 includes all absentee and provisional ballots within 16 days of Election Day.
- 668 2. The vote count audit may be conducted in two stages.
- 669 a. Stage one, the vote counts are audited without taking into account the  
670 provisional and absentee ballot vote counts. The initial stage one auditable  
671 vote count report shall include the number of total absentee and provisional  
672 ballots that were cast and not yet counted in each county, and
- 673 b. Stage two, after the absentee and provisional ballots are evaluated for  
674 eligibility and counted, then an addendum to the initial auditable vote count  
675 report is created and submitted that accounts for the new vote counts. In a  
676 two stage audit, the absentee and provisional ballots shall be counted, sorted,  
677 stored, and reported in the auditable vote count report addendum in  
678 identifiable batches that are equal in size or smaller in size to a median-sized  
679 vote count (in number of ballots cast) in the county, or, if not, then 100% of  
680 absentee and provisional ballots shall be audited in that county.
- 681 3. Any addendum to the auditable vote count report shall be publicly posted and  
682 distributed under the same requirements as for the initial auditable vote count report,  
683 prior to any random selections of its auditable vote counts.
- 684 4. The Election Audit and Recount Committee shall determine the audit amounts and  
685 procedures for two-stage vote count audits subject to the requirements of this statute.

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- 686 5. In a one-stage audit where absentee and provisional ballots are included in the initial  
687 auditable vote count report and audited with other ballots in the election, then the  
688 absentee and provisional ballots may be counted, sorted, stored, and reported  
689 according to the same identifiable auditable vote counts or precinct vote counts as  
690 the election day and early voting ballots. If they are not, then the absentee and  
691 provisional ballots shall be counted, sorted, stored, and reported in the auditable vote  
692 count report in identifiable batches that are, as close as possible, equal in size to the  
693 median-sized vote count (in number of ballots cast) in the county.
- 694 6. The absentee and provisional ballots shall, if voting equipment and procedures  
695 conveniently permit, also be reported by precinct in the auditable vote count report.  
696

#### 697 **Funding for Mandatory Vote Count Audits**

---

698 This bill authorizes \$260,000 (\$260 Thousand) per general election cycle (in even years) to  
699 reimburse counties for the costs of conducting independent audits of vote count accuracy.  
700 Funds shall be distributed after the audits are completed in an amount of up to \$100,000 to  
701 cover expenses of the State Election Audit & Recount Committee for one auditable election,  
702 and \$2,000 to be reimbursed to each county for administrative fees plus the remaining amount  
703 to be distributed to each county to pay the vote count auditors and other expenses, in  
704 proportion to the total number of ballots which are hand counted in the audits in each county.  
705 All these amounts may be increased each year according to inflation according to the method  
706 that the state uses to adjust for inflation.

707 *[Note: Change the amounts for your state. A more detailed analysis of costs can be done using election results*  
708 *data from prior auditable elections for each county.]*

709

---

710 **One Efficient Method for Selecting Vote Counts to Audit that the Election**  
711 **Audit and Recount Committee Might Use [Statute Should Not Include This]**

712 **Error Bounds for Each Vote Count:**

713 Within any one vote count, the maximum possible amount of error in the reported margin (in  
714 votes) which could deny the closest runnerup a rightful win is equal to the number of ballots  
715 cast plus the margin in votes between the lowest scoring winner and the highest scoring loser:

716  
717 
$$e_i = (b_i + r_{i1} - r_{i2})$$

718 Where  $(r_{i1} - r_{i2})$  is the reported unofficial vote margin  
719 between the lowest scoring winner and the highest scoring loser (or losing alternative in the  
720 case of certain contests) and  $b_i$  is the number of ballots cast in the auditable vote count (or  
721 precinct) numbered i. For example, the maximum possible margin error is 200% of all ballots  
722 if the runnerup has zero reported votes but voters had actually given the runnerup 100% of  
723 votes.

724  
725 If desired, a multiplier of between 0 and 1 could be multiplied times  $e_i$  to reflect the fact that if  
726 100% of all available ballots were incorrectly counted for the unofficial winner in any vote  
727 count, then such a vote count would be immediately suspicious to voters, so that a vote  
728 fraudster would be unlikely to switch 100% of available target ballots and any errors this large  
729 would be immediately suspicious. This author recommends that any such multiplier should be  
730 greater than or equal to 0.50 and, if a multiplier of less than 1 is used, then a minimum of one  
731 vote count in each separately administered jurisdiction where an election contest occurs should  
732 be randomly selected for audit in addition to the number selected by the formula for the  
733 number of selection rounds below. Example: Using a multiplier of 0.50 with a minimum  
734 requirement of 1 vote count audited per county for every county for each election contest,  
735 results in an overall 5.5% audit of precincts in Utah's federal and state-level election contests  
736 in its 2004 general election.

737  
738 **The Total Possible Error in Each Election Contest:**

739  
740 
$$E = \sum_i e_i$$
 Sum the error bounds of all the reported unofficial vote counts.

741  
742 **Selection Probability for Each Auditable Vote Count:**

743 
$$p_i = \frac{e_i}{E}$$
 The weighted selection probability for each vote count is found by

744 dividing each vote count's upper bound for margin error by the total possible error in all vote  
745 counts.

746

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747 **The Overall Margin in Each Election Contest**

748

749 
$$M = R_1 - R_2$$

750 Where M=margin in votes, R<sub>1</sub> = #votes for winner, and R<sub>2</sub> =

751 #votes for closest runner-up

752

753 **Number of Selection Rounds:**

754

755 
$$t = \frac{\ln(\alpha)}{\ln(1 - M / E)}$$

756 The number of selection rounds t, is the natural log of alpha divided by

757 the natural log of the quantity one minus the margin M divided by the sum of the error bounds

758 for all auditable vote counts in the election contest. Alpha is 1 minus the confidence level. I.e.

759 alpha is the desired maximum probability that if there exists a subset T of auditable vote counts

760 with enough error sufficient to alter an election outcome, at least one member of T will be in

761 the audit. Eg. If the confidence-level is 95%, then alpha is 0.05 or 5%.

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