

1 **Mandatory Post-Election Vote Count Audit**

2 **A Short Legislative & Administrative Proposal**

3 December 20, 2008

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8 **General Description:**

9 Voters, candidates, citizens and election officials want high confidence in the integrity of the
10 election process by subjecting electronic vote counts to independent hand-counted post-
11 election audits that would find error whether accidental or intentional; and would deter fraud,
12 and by making reports available with which to evaluate rates of voter turnout, voting
13 equipment allocation, under-votes, over-votes, spoiled ballots, voting equipment failure,
14 absentee ballots, uncounted ballots, and provisional ballots provide for continuous
15 improvement in elections procedures. This bill requires routine independent audits of vote
16 count accuracy and requires the release to vote count auditors of records and information
17 necessary to verify the integrity of the vote count audits and to evaluate voter service levels.

18
19
20 **Amend existing statute to extend the canvass period to 28 days.** *[Note: The canvass period*
21 *between Election Day and certification of election results should be 28 days to allow ample time for conducting*
22 *vote count audits prior to certifying the election results – 28 days is a common canvass period in some states.]*

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

25
26 **Amend existing statute to require that all printed, unused, used, and spoiled ballots shall**
27 **be retained for the 24 month federal preservation period.** *[Note: All printed ballots must be*
28 *reconciled or accounted for during the audit to be able to enable detection of evidence of ballot substitution,*
29 *ballot box stuffing, and ballot tampering.]*

30
31 *[Note: This statute may replace current recount statutes because the mandatory post-election vote*
32 *count audit sample size will automatically adjust up to a 100% (recount) whenever necessary to ensure*
33 *that a very close election contest is decided accurately. Overall, in Utah's 2004 general election, 5% of*
34 *the number of total auditable vote counts for federal and state-level election contests would have been*
35 *audited in order to meet the requirements of this statute.]*

36
37 **Section 1. Definitions.**

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

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40 (b) “Auditable Election Contest” means all election contests for a state or federal office, all
41 state-wide ballot propositions; and all state, county, or municipal election contests for the
42 position of an election official such as the county clerk’s office.

43 (c) “Auditable Vote Count” means a tally of votes that is publicly reported for an auditable
44 election contest obtained from counting a group of one or more ballots that are counted at one
45 place and time or by one electronic voting device. Auditable vote counts can be precinct or
46 polling location vote counts made by any voting system, including electronic voting devices,
47 automatic tabulating equipment, optical scanning equipment, or hand-counted, or can be
48 electronic voting device counts, or batches of ballots counted by hand or by automatic
49 tabulating equipment where each vote count is associated with a number of ballots maintained
50 as a group. A vote count may be an individual ballot if the voting system produces an auditable
51 report of vote counts with humanly readable identifiers for individual ballots and preserves
52 ballot privacy.

53 (d) "Confidence-level" means 100% minus the maximum chance that an incorrect election
54 outcome is certified. [Note: Certifying an election outcome at 95% confidence-level means
55 that at most there is a 5% chance that an incorrect election outcome that occurs would be
56 incorrectly certified.]

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

60 (f) “Election audit records” include voting machine testing plans and results, electronic voting
61 device and automatic tabulating equipment audit and system log files, ballot definition files
62 used by voting machines to cast or tally votes, voter-verifiable paper records and paper ballots,
63 vote totals tapes, zero tapes, unused and spoiled ballots, provisional and absentee and
64 provisional ballot envelopes and related applications; including for ballots judged to be
65 ineligible, digital storage devices that store ballot information and/or voting results information
66 in a non-volatile form, records of purchased material and services including purchase orders
67 and incoming inspection records on purchased parts and services, voting system redundant
68 vote data, election data media devices, polling place event logs, precinct tally results, central
69 count tally results, consolidated results, records created at the polling places or county election
70 office, written procedures provided to poll workers and election judges, pollbooks and voter
71 registration materials, written chain of custody and security procedures for regulating access to
72 paper and electronic ballot records, and for regulating access to electronic voting devices and
73 automatic tabulating equipment, chain of custody logs containing signatures for documenting
74 access and the reasons for it, logs of security seals and access to election-related storage areas,
75 video records of surveillance cameras. Specific passwords and security keys used for chain of
76 custody or security shall be redacted. Date of birth may be redacted from voter registration
77 records if age in years, accurate to within one year, is included.

78 (g) “Election outcome” means which candidates or ballot propositions win or lose an auditable
79 election contest.

- 80 (h) "Hand-count" means a counting of the votes, wherein the handling of the voter verifiable
81 paper ballot records is done by human hand and the identification of each vote is determined
82 by a visual inspection of said records by human beings.
- 83 (i) "Maximum possible margin error" means the number of cast ballots plus the difference of
84 votes between the winner and the runner-up of an auditable election contest.
- 85 (j) "Percentage margin" means the difference in total reported votes between the winner and
86 the runnerup of an election contest divided by the number of cast ballots that were eligible to
87 vote in that election contest.
- 88 (k) "Random selection or random drawing" means that items are selected by using statistically
89 valid probability sampling methods including simple random samples or stratified random
90 samples.
- 91 (l) "Vote count audit" means an independent audit of all auditable elections and auditable
92 election contests conducted by vote count auditors, following the procedures required by the
93 Election Audit & Recount Committee, for the purpose of checking the accuracy of election
94 outcomes by a method of randomly selecting auditable vote counts and comparing hand counts
95 of all voter-verifiable paper ballot records associated with the selected auditable vote counts
96 with the auditable vote counts.
- 97 (m) "Vote count auditor" means a person selected to conduct a vote count audit who meets the
98 criteria determined by this statute and the Election Audit and Recount Committee.
- 99 (n) "Vote count audit plan" means the published plan containing the rules, standards, policies,
100 procedures, and methods developed by the Election Audit & Recount Committee for
101 conducting vote count audits.
- 102 (o) "Voter-verifiable paper record" means the following auditable records of votes cast:
- 103 a. A paper ballot marked by the voter for the purpose of being hand counted or read by
104 automatic tabulating equipment;
- 105 b. A paper ballot marked by the voter to be mailed to an election officer, whether from
106 a domestic or overseas location;
- 107 c. A paper ballot created through the use of a ballot marking device if, in each case, the
108 record permits the voter to verify that the record is correct before the ballot is cast; or
- 109 d. A human-readable paper printout of the voter's vote produced by a touch screen or
110 other electronic voting machine, or a voting device if, in each case, the record permits
111 the voter to verify that the record is correct before the ballot is cast.
- 112 (p) "Voting system" means a collection of one or more electronic voting devices, voting
113 machines, automatic tabulating equipment, ballot marking devices, and procedures that allow
114 voters to view ballots, select candidates and cast votes, and that allow election officials to
115 secure and transport election audit records and to aggregate and tabulate the votes cast in an
116 election.

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

119 (1) For every auditable election, each county shall, in accordance with this statute and
120 according to a Vote count audit plan approved by the Election Audit & Recount Committee,
121 and under the direction and supervision of the Election Audit & Recount Committee or their
122 designees, conduct a “vote count audit” of all auditable election contests after publicly
123 releasing auditable vote count reports. Procedures for conducting vote count audits shall be
124 determined by the Election Audit & Recount Committee as set forth herein.

125 (2) The public shall be allowed to observe, verify, and point out procedural mistakes in all
126 phases of the vote count audit without interfering with the process.

127 (3) **Amount of vote count audits:** Hand-counts of the voter-verifiable paper records
128 corresponding to each auditable vote count shall be conducted such that:

129 (a) the state-wide vote count audit sample size shall provide a 95% confidence-level.
130 *[I.e. There shall be no more than a 5% chance that any incorrect election outcome would be*
131 *incorrectly certified,]* The calculation of vote count audit sample sizes for any election
132 contest shall depend on the amount of maximum possible error that each auditable vote
133 count can harbor, assuming that at least 40% of the maximum possible margin error
134 could have occurred within any auditable vote count; and ¹

135 (b) in addition to the randomly selected auditable vote counts in a) above, if at least one
136 auditable vote count has not been selected for each auditable election contest in each
137 county in which the auditable election contest occurs then one auditable vote count
138 shall be randomly selected for auditing from within each of such missed counties for
139 each auditable election contest; and

140 (c) in addition to the randomly selected auditable vote counts in a) and b) above, two
141 discretionary auditable vote counts may be selected for auditing by the candidate who
142 is the leading runnerup or by an issue committee or by the political party for any state-
143 wide auditable election contest and one discretionary auditable vote count may be
144 selected for auditing by the candidate who is the leading runner-up for any other
145 auditable election contest.

146 *[Note: The state-wide vote count audit sample size for an auditable election contest may be estimated for*
147 *planning purposes by taking a number of auditable precinct or batch absentee/provisional vote counts*

148 *equal to $p \left(1 - 0.01^{\frac{0.4(b+w-r)}{p^{(w-r)}}} \right)$ where p is the number of total precincts or other auditable vote counts,*

149 *b is the number of ballots cast, w is the number of votes of the winner, and r is the number of votes of the*
150 *runnerup in the election contest. Any fractional remainders must be rounded up to the next integer. (Eg.*
151 *1.05 becomes 2). This formula will over or under estimate the audit sample size for some auditable*
152 *election contests.]*

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

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153 [Note: The intent is to make sure that at least one vote count for each auditable election contest is
154 audited in each county. Vote counts which calculations show are "suspicious" as compared to prior
155 elections or to partisan voter registration or partisan turnout can be selected by candidates for audit.^{2]}

156 (4) **Vote count auditor access to election audit records:** Each election officer shall make
157 available any election audit records to vote count auditors during the vote count audit.

158 (5) **Exceptions to vote count audits for certain auditable election contests:** A vote count
159 audit shall not be required of a particular auditable election contest under this subtitle if

160 (a) the winning candidate in the election had no opposition on the ballot; or

161 (b) if a 100% hand recount of voter-verifiable paper records has been, or will be,
162 conducted of the same auditable election contest, or

163 (c) if there is a percentage margin of at least 70% in an auditable election contest and
164 there was a percentage margin of at least 70% for the same candidate in the same
165 auditable election contest in the most recent prior audited election.

166 (6) **Certification of election results:** Neither the State Election Office nor any county may
167 canvass or certify the results of any auditable election contest which is subject to a vote count
168 audit under this subsection prior to the completion of the vote count audits and the
169 announcement and publication of vote count audit reports as proscribed the Election Audit &
170 Recount Committee.

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

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178 **Section 3. State Election Audit & Recount Committee**

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

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

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

37 ² Note: Calculation of "suspicious" precincts could assume for instance, that at most a 20% vote shift per precinct
38 or batch vote count is not suspicious and compare the partisanship of voters to the partisanship of election results
39 in the current and prior audited elections as recorded in voter history files to determine vote counts having more
40 than a 20% shift, or another measure could be used for the upper limit of the amount of vote miscount that
41 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)
42 [audits/History-of-Election-Auditing-Development.pdf](http://electionarchive.org/ucvAnalysis/US/paper-audits/History-of-Election-Auditing-Development.pdf)

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187 (ii) an owner, employee or sub-contractor of a voting system company, or
188 voting system service company, or voting system supply company; or
189 (iii) working for any political candidate's campaign or ballot proposition.

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

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

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

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

203 (iv) two members who are **financial auditors** appointed by the State's Chief
204 Auditor,

205 (v) three **political party** members appointed by the chair persons of the three
206 State political parties that garnered the most votes in the State in the last federal
207 election, all of whom shall be invited to appoint someone to serve on the com-
208 mittee,

209 (vi) four members who are appointed by the trustees of grassroots nonprofit
210 **election rights or open government organizations** in the State and who have
211 served in a prior election as an election judge or poll worker,

212 (vii) at least four non-voting members who are **county election officers**,
213 appointed by the association of county election officials;

214 (viii) one non-voting member appointed by the State Election Office; and

215 (ix) one **attorney with expertise in election law** appointed by the State
216 Attorney General's Office to serve as a non-voting member of the committee to
217 give advice on the legality of the operations of and any rules and regulations
218 proposed by the E.A.R.C.

219 (c) ensure that the organizations which are qualified to appoint State E.A.R.C. members
220 are notified and E.A.R.C. members are appointed at least forty-five (45) days prior to
221 the second Monday in January in each auditable election year, and arrange for space,
222 teleconference and other facilities for E.A.R.C. meetings and to meet E.A.R.C.
223 requirements; and publicly publish any reports submitted by the E.A.R.C.

224 [Notes: *Although input from county and state election offices is necessary for coordination (and*
225 *therefore county elections officers are included as members) voting system insiders should be*

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- 263 (b) a method or methods for securing access to election audit records to prevent the
264 addition, subtraction, substitution, or alteration of any paper or electronic election audit
265 records.
- 266 (c) a method or methods for determining vote count audit sample sizes that meets the
267 confidence-level requirement of this statute;
- 268 (d) a method or methods for making random selections or random drawings of vote
269 counts to audit. The selection may be proportional to the amount of maximum possible
270 margin error within each auditable vote count. Each auditable vote count shall have a
271 nonzero chance for selection;
- 272 (e) rules, standards, policies, procedures and processes for conducting ballot, voter, and
273 vote count reconciliations, and vote count audits according to the requirements of this
274 statute;
- 275 (f) a method or methods to appoint a chief independent auditor to oversee each county's
276 vote count audits;
- 277 (g) a method or methods to select vote count auditors and to assign vote count auditors
278 to manually count specific auditable vote counts;
- 279 (h) a uniform format for auditing forms and for vote count audit reports;
- 280 (i) methods for analyzing vote count audit discrepancy results and protocols for decid-
281 ing whether to certify the election contest or to expand the vote count audit sample size
282 using methods that meet the requirements of this statute and account for the vote count
283 audit sample size design criteria;
- 284 (j) requirements for public notice, public access, and public disclosure of auditing pro-
285 cedures, election audit records, and auditable and audit reports;
- 286 (k) a time table for vote count audit processes; and
- 287 (l) responsibilities of county and state election officials regarding vote count audits.
- 288 (2) The E.A.R.C. shall publicly publish the vote count audit plan and provide for a period of at
289 least one month of public review and comment on it before approving, publishing and
290 implementing the vote count audit plan before each auditable election.
- 291 (3) The E.A.R.C. is authorized to coordinate with the State Elections Office, State Auditor's
292 Office, County Election Officials and with vote count auditors.
- 293 (4) The E.A.R.C. shall decide whether to expand the audit sample size or to certify an election
294 contest for each auditable election contest.
- 295 (5) The E.A.R.C. shall publicly publish a report evaluating the efficacy and efficiency of
296 election audits within 90 days following each auditable election, and shall advise the State
297 Election Office and the State Legislature of any problems or recommendations to reduce vote
298 count errors or to improve voting and election systems.
- 299 (6) The E.A.R.C. shall advise the State Election Office and County Election Officials by
300 evaluating the auditability of new voting systems considered for purchase.

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- 301 (7) The E.A.R.C. or its designees shall be available during the vote count audits to consult with
302 election officials or vote count auditors regarding issues that arise.
- 303 (8) The E.A.R.C. shall advise the State Election Office on request for proposals (RFP) for
304 voting system studies or purchases and on contracts with any voting and election system
305 providers including providers of voter registration, pollbook, vote-casting or counting systems
- 306 (9) The E.A.R.C. shall be subject to State open records and meetings laws.

307

308 -----

309 **Section 5. Audit All Ballot Types**

310 All ballots that are cast in an auditable election contest shall be first reported in an auditable
311 vote count report and then subjected to auditing, including votes cast at the precinct or
312 equivalent location on or before the date of the auditable election, and votes cast by absentee
313 voters, absent uniformed services voters, and overseas voters, and votes cast by provisional
314 ballot.

315 -----

316 **Section 6. Additional Vote Count Audits If Cause Shown**

317 If the auditors are unable to reconcile the hand count with the electronic vote tabulation, then
318 the E.A.R.C. with the assistance of County and State Election Officials shall initiate or conduct
319 such further investigation of the discrepancies as may be necessary for the purpose of
320 reviewing whether or not to certify the election results, and may expand the vote count audit
321 sample size up to a 100% hand recount.

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

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

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

335 If vote count auditors find sufficient discrepancies, due to any cause, between the initial
336 auditable vote count reports and the hand-count vote count audit tallies, then the E.A.R.C. shall
337 randomly select and administer hand counts of additional auditable vote counts as the E.A.R.C.

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338 considers appropriate to resolve concerns about the accuracy of the election outcome until the
339 election outcome can be certified according to the requirements of this statute.

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341 **Section 7: Vote count audits may be conducted in stages**

342 The vote count audit may be conducted in two stages.

- 343 a. The initial auditable vote count report shall include the auditable vote counts
344 for all counted ballots included in the initial vote tallies for each auditable
345 election contest and shall include the number of absentee and provisional
346 ballots that were cast and not yet verified as eligible or counted in each
347 county, and
- 348 b. After the absentee and provisional ballots are evaluated for eligibility and
349 counted, then an addendum to the initial auditable vote count report shall be
350 submitted that accounts for these additional auditable vote counts. Any
351 ballots that were not included in the initial auditable vote count report shall
352 be counted, sorted, stored, and reported in the auditable vote count report
353 addendum in identifiable batches that are, as close as possible, equal in size
354 or smaller in size to the median-sized auditable vote count (in number of
355 ballots cast) in the county, or, if not, then 100% of absentee and provisional
356 ballots shall be audited in that county.

357

358 **Funding for Mandatory Vote Count Audits**

359 This bill authorizes \$250,000 (\$250 Thousand) per general election cycle (in even years) to
360 reimburse counties for the costs of conducting independent audits of vote count accuracy.
361 Funds shall be distributed after the audits are completed in an amount of up to \$90,000 to cover
362 expenses of the State Election Audit & Recount Committee for one auditable election, and
363 \$2,000 to be reimbursed to each county for administrative fees plus the remaining amount to be
364 distributed to each county to pay the vote count auditors and other expenses, in proportion to
365 the total number of ballots which are hand counted in the audits in each county. All these
366 amounts may be increased each year according to inflation according to the method that the
367 state uses to adjust for inflation.

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

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References:

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372

373 *Reviewers/contributors to Mandatory Vote Count Audit - A Legislative & Administrative*
374 *Proposal* <http://utahcountvotes.org/legislature/Reviewers-Coauthors.pdf>

375

376 *The California Secretary of State, under the authority vested in the Secretary by Section 15601*
377 *of the Elections Code proposes to adopt regulations in Title 2, Division 7, Chapter 8 of the*
378 *California Code of Regulations governing the conduct of election recounts.*

379 <http://www.sos.ca.gov/elections/ccrov/pdf/2008/december/083311f.pdf>

380 http://www.sos.ca.gov/elections/elections_recountregs.htm

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384 <http://electionarchive.org/ucvAnalysis/US/paper-audits/legislative/VoteCountAuditBillRequest.pdf>

385

386 *Principles and Best-Practices for Post-Election Audits* -- Statistical portions, principles 5–7
387 and their best practices, endorsed by the American Statistical Association.

388 http://electionaudits.org/files/bestpracticesfinal_0.pdf

389

390 *Derivation of the formula for the number of selection rounds for the Probability Proportional*
391 *to Margin Error Bound (PPMEB) method for determining samples for Vote Count Audits*

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