Proposed Practices for the Post-Election One Percent Manual Tally in Alameda County

Prepared for the Alameda County Registrar of Voters Election Advisory Committee
By Nancy Bickel, Past Chair, Alameda County Council, League of Women Voters, Judy Bertelsen, M.D., and David Wagner, Associate Professor of Computer Science, University of California, Berkeley
With the assistance of Peter J. Bickel, Professor of Statistics, Arel Cordero, graduate student in Computer Science, University of California, Berkeley, and Chris Jerdonek, Ph.D., Northern California Representative of FairVote.
June 2007

> "One percent manual tally" is the public process of manually tallying votes in 1 percent of the precincts, selected at random by the elections official, and in one precinct for each race not included in the randomly selected precincts. This procedure is conducted during the official Canvass to verify the accuracy of the automated count.
>
> California Election Code 336.5.

SUMMARY

WE RECOMMEND THE FOLLOWING PRACTICES FOR THE 1% MANUAL TALLY IN ALAMEDA COUNTY

Some of the practices described are currently required or will be required for future elections by the Election Code; others add to or amplify the Election Code requirements in 336.5 and in 15360 as amended and filed with Secretary of State, Sept. 30, 2006. Many of the Committee's recommendations agree with those of other advocates of election reform. Since the draft version of this report of February 2006, the ACROV has adopted in whole or part many of its recommendations, as have Registrars in other counties.

Alameda County Registrar of Voters Dave Macdonald responded to these recommendations in a letter of April 18, 2007 and at a meeting with Nancy Bickel on April 23, 2007. Registrar Macdonald's responses are directly cited or summarized after each recommended practice below. His letter appears as Appendix B. Where appropriate the committee includes a comment on the Registrar's response.

1. Random. The precincts or other units should be chosen at random.
Election Code 15360 (c) states that the Secretary of State specify approved methods for selecting the 1%, whether random number generator or other method. There are several methods that might meet this requirement, including drawing balls from a tumbler or metal drum (as was done in the November, 2006 election) and throwing special dice.

Any sampling method use should be tested for fairness before and/or after it is employed.

Response: "The Registrar will continue to use the metal drum method." The Registrar writes that his office completed a comprehensive review of this method.

2. **A genuine and independent test.** The purpose of the hand count of the 1% sample is "to verify the accuracy of the automated count." We understand this to mean that it should be a genuine and independent test or audit of the accuracy and completeness of the official Statement of the Vote.

Response: "The Registrar of Voters' manual tally is a genuine and independent test of the accuracy and completeness of the Official Statement of Vote… The Registrar of Voters is committed to executing an efficient and orderly manual hand count of 1% the votes cast to ensure the accuracy of the automated count."

3. A comprehensive test.
Every single vote cast and counted in the election should be included in the pool or pools of votes sampled. Every vote cast should thus have approximately a 1% chance of being drawn and hand counted in the sample.

Response: "It has been and will continue to be the practice of the Registrar of Voters Office to perform a 1% sampling of all ballots cast from the tallying types of Absentee, Polls, Provisional, Vote by Mail and Early Voting."

4. 1% sample selected and counted after all ballots counted. To ensure a comprehensive test, the 1% sample should be selected and the audit carried out only after all ballot counting is completed.

Response: "Due to the 28 day election certification constraint, it may not always be feasible to count all ballots cast and select the precinct sample before performing the 1% Manual Tally." In conversation Registrar Macdonald observed that his goal would be to follow recommendation 4.

5. The preliminary Statement of Vote published and printed before the 1% is selected. The SoV should be "frozen" before the random sample is selected and the audit is begun. No changes should be made to the Statement of Vote until the 1% audit is completed.

Response: "Printing and publishing of a Preliminary Statement of Vote prior to performing the 1% Manual Tally cannot be prepared for the reasons of misinterpretation and or misuse of an unofficial preliminary report. The Registrar of Voters will only print and publish the Official Statement of Votes cast for each election."

Comment: The ROV does, however, publish unofficial reports of votes cast, beginning a few minutes after the close of the polls on Election Day. These reports are published on the ROV website, the Secretary of State website and in print every hour or two until all electronic votes are reported from all polling places and other sources, usually by the morning after Election Day. During the 28 days of the Canvass, revised reports are published every few days until the Registrar is ready to issue the Official Statement of Votes.

We therefore suggest that the ROV publish, print and "freeze" such a Report of all election results, giving results by precinct, immediately before drawing and hand counting the 1% sample. The Registrar could then treat this Report as the standard to which the hand count of each of the precincts is compared. Any discrepancies between the two would then be reported and explained as discussed below. This procedure would modify only slightly the past and current practice of the

ACROV, which has been to print out individual reports for each precinct or category that has been selected for the 1% sample and use that as the standard to which the hand counts are compared.

6. Precincts and other units sampled must match those published in the preliminary and final Statement of Vote, so that the results of the hand count can be exactly compared to the preliminary results.

If the categories from which the 1% hand count are selected and counted are exactly the same as the categories reported by the Registrar of Voters in the Election Summary Report and in the preliminary Reports and final Official Statement of Vote, the ROV and public observers will be able to recognize any discrepancy between the hand and machine counts and seek and find its cause.

Response: "Our office will continue to perform a 1% sampling of all ballots cast." In discussion, the Registrar said that he would consider and discuss with staff what categories of votes, for example, Early Votes, Absentee, Provisional etc., would be reported in the preliminary Reports and the final Statement of Vote.

Comment:

For future elections, new requirements in the Election Code will insure that recommendation 6 is completely or nearly completely met, since it requires that all or nearly all ballots be physically sorted into their 'home' precincts. The Election Code will require that **absent voter's ballots** (absentee ballots) be included in the 1% sample of precincts and that **early votes** [cast on direct recording electronic voting systems at the ROV or satellite locations before Election Day] be sampled either as part of the 1% sample of precincts or in a separately drawn 1% sample. The Registrar assumes that the precincts sampled would include all precincts, currently 1219, not just those with polling places, and that the 1% sample of precincts would also include provisional ballots, damaged ballots and other categories of ballots, even those that have been traditionally processed very late in the Canvass.

Since the Registrar will in future be physically sorting all or nearly all categories of ballots into their precincts, if the Registrar also continues to publish its preliminary Reports by precinct and if he "freezes" a Report right before doing the 1%, the Registrar and the public will be able to see that the categories reported for the sample exactly match the categories counted during the 1% tally. If the Registrar decides to sample the **early votes** separately from the consolidated 1% sample of precincts, then he should publish a separate preliminary Report of all Early Votes just before drawing and counting that sample.

7. The manual tally should be a public and transparent process. Members of the public observing the process should be able to follow it with complete comprehension; they should be able to hear, see and understand everything that is happening. The intent of the legislature to make this so is clear in the recent amendments to the Election Code. [Section 15360 (d) and (e)]

Response: "For a better understanding and observation of the 1% manual tally process, the viewing area will be extended so that the onlooker may follow the process with complete comprehension. In addition, a complete set of summary reports will be updated throughout the

tally for easy review by the public." In discussion, Registrar Macdonald and his staff explained that they plan to extend the physical area within which public observers can move and observe along two adjacent walls of the workroom, rather than limiting observers to a small area at one end of the room. When observers are able to walk along the area to get a better look at what various workers are doing, they will be able to see the activities in more detail. In addition, the ROV plans further improvements to the layout of the work area, which will make it easier to see what is going on.

The "complete set of summary reports" will be placed on a table accessible to observers. As soon as each recount board completes the hand counts of votes for a candidate, a race or an issue in the precinct and has checked the result with a supervisor, the supervisor will write down the result of the hand count beside the printed result on the preliminary or summary report. Observers will be able to look at the recent and all previous records of the hand count. Any discrepancies which are not the result of simple hand counting errors by the recount board members would therefore be recorded immediately.

Comment: The simple improvements described by the Registrar should improve the ability of public observers to see, hear and understand the 1% recount.

7a. Public notice of and public selection of the 1% sample. Five day public notice of the time and place of the selection will be required by the Election Code in future elections.

Response: "At least five days prior to the random drawing the ROV will post on the ACROV website the date, time and location of the precincts to be selected for the 1% tally [ie. the date, time and location of the precinct selection] and a schedule of other canvassing events will also be posted."

7b. **The selection method should be easy to understand.** We further recommend that the method of selecting samples should be easy for the observing public to understand and verify. The physical selection method used by the ROV in the November 2006 election and described in this report is easy to understand. The ROV explained the process and provided a list of all precincts to observers so that they could see and understand which precincts were drawn.

Response: "Copies of the 1% [selection process and] manual tally procedures will be distributed to all observers and an over view of the [selection] process will be explained before the 1% [selection process and] manual tally process commences."

7c. Public notice of and public counting of the 1% samples with procedures that the observing public can hear, see and understand. The Election Code will require five day public notice for the hand tally in future elections.

Response: Improvements to ensure that the public can hear, see and understand are described in the response given under 7 above. The Registrar response in 7a above is that he will meet the five day public notice requirement.

7d. The procedures for carrying out the sample and the count should be public and publicized in writing in advance of the election. The ACROV should review its written

procedures governing these aspects of the audit and should make these procedures available to the public.

Response to 7c & 7d: "Copies of the 1% manual tally procedures will be distributed to all observers and an overview of the process will be explained before the 1% manual tally process commences."
"All procedures for the random draw of precincts and the 1% Manual Tally will be posted on the ACROV website for public reference."

7e. The preliminary Statement of Vote for each of the precincts or other units sampled during the 1% audit should be published and made available to the public before the sample is randomly drawn, so that the observing public can follow the process step by step.

Response: See the Registrar response to Recommendation 5 above and our comment on his response.

8. Identify, resolve, explain, publish discrepancies. The Registrar of Voters should publish in advance its procedures for handle any discrepancies that may be discovered during the 1% audit. The Election Code requires that in future elections the ROV publish a report on the discrepancies found and an explanation of their resolution.

> …include a report on the results of the 1 percent manual tally in the certification of the official Canvass of the vote. This report shall identify any discrepancies between the machine count and the manual tally and a description of how each of these discrepancies was resolved. In resolving any discrepancy involving a vote recorded by means of a punchcard voting system or by electronic or electromechanical vote tabulating devices, the voter verified paper audit trail shall govern if there is a discrepancy between it and the electronic record.
> Election Code 15360 (e)

Response: "Pursuant to the California Elections Code, handling of any discrepancies will be researched and explained before the manual tally is completed. An accounting of any discrepancies will be recorded on a spreadsheet. The Spreadsheet will consist of 3 columns made up of the following: Precinct number, Balanced- Yes/No and Resolution of the discrepancy. A report of the results of the 1% manual tally will be prepared for inclusion into the official canvass."

9. Reconsider whether a 1% sample is adequate to test the accuracy of the ballot. This often-raised question could most effectively be considered by the ACROV as part of a statewide discussion among election officials, interested citizens and appropriate technical experts. The adequacy of a sample depends upon multiple factors, such as the number of precincts included in the sample, the total number of votes per race in the sample and the margins of victory in the races, not just the percentage of the sample (e.g., 1%). So although 1% might be more than adequate to test say, the accuracy of the vote in Alameda County for candidates for statewide or countywide office, it might not give a large enough sample to test the accuracy of a close vote in a small local election.

Response: "The Registrar of Voters will continue to select 1% of the precincts in an election to be

recounted by hand. In addition to the precincts in the 1% count, supplementary precincts are selected for each contest not included in the original random sampling [as the Election Code continues to require]." In discussion, the Registrar observed that counting 1% of the ballots requires so many staffers and so much time that it has been a challenge to complete it within the strict limits of the 28 days allowed for the Canvass. We also observe and describe in this report the time pressures of the canvass. The new requirement to sort all ballots into their 'home' precincts will add to the difficulty of completing the hand count in time. Consequently, the Registrar is not interested in expanding the number of ballots to be hand counted.

LARGER CONTEXT OF 1% SAMPLE. Sample size needs to be considered in the larger context of the ultimate goal of the sample—to ensure an honest and accurate election. The goal is that every vote cast is counted accurately and that the candidates and measures that win in an election win honestly. Increasing sample size would be intended to increase the likelihood of discovering error or fraud. Preventing error and fraud from occuring might make larger sample sizes seem less necessary. Improvements have already been made and continue to be made in all aspects of prevention and should continue. They include tightening up all aspects of election management, designing and testing machines and software to prevent error and fraud, improving training of election officials, and increasing the security of the equipment and the process. Although much can be done at the local level--and is being done in Alameda County-- to ensure this goal, some of these improvements can only be carried out at the national or state level.

**Comparison of ACROV November 2006 Election Practices,
And ACROV Plans for Future Elections with Committee's Proposed Practices**

Committee's Proposed Practice	2006	Future Plans•••
1. Random	yes*	yes*
2.Independent	yes	yes
3.Comprehensive	yes**	yes
4. 1% selected after ballot count complete	almost	if possible
5. Statement of Vote published before 1% selected	no	no•
6. Exact match of categories in Preliminary & Final SoV	no	probably••
7. Public and transparent process	half way	yes
a. public notice and selection of sample	yes***	yes
b. understandable sampling method	yes	yes
c1. public notice of count	yes	yes
c2. public could see, hear and understand counting	half way****	yes
d. methods public and publicized in advance	no	yes
e. preliminary SoV public	no	possibly••
8. Discrepancies announced, explained	no*****	yes

Notes
* ACROV may need to seek Secretary of State approval for method.
**Early vote VVPATs were not separately sampled and hand counted, however, 100% of VVPATs were checked using scanning method. See following discussion.
***Notice was 1 day and only to those who had requested notice, not to public at large
**** Public could see, but not hear or understand counting process
***** ACROV had an internal process to identify, resolve discrepancies, but did not publish its method or its findings

• ACROV could publish and freeze unofficial but comprehensive report, which would in effect meet this Proposed Practice. See discussion.
•• If ACROV sorts all ballots into their 'home' precincts, includes all categories of ballots in the 1% sample of precincts and publishes a complete unofficial report by precinct and ballot category immediately before drawing sample, this Proposed Practice would be met.
••• All comments assume that the ACROV carries out his proposed improvements to the procedures as described in the Summary.

Proposed Practices for the Post-Election One Percent Manual Tally in Alameda County

BACKGROUND

Since 2000 Alameda County has used four different sets of voting equipment and four different methods of voting in four major elections. Dramatic problems in the 2000 Presidential election, particularly in Florida, caused widespread public alarm and led to national and state legislative responses which rushed vendors to build and local governments to buy novel, unfamiliar and little tested election equipment.

In fall of 2005, Acting Registrar Elaine Ginnold created an Election Advisory Committee to give the department advice on a variety of election issues, particularly how to improve public trust in the accuracy and honesty of elections. A sub-committee undertook study of how the 1% sample of precincts and the manual count of that sample could be improved. The draft report, presented in February 2006, may be found at http://www.countedascast.com/docs/Principles-Criteria-For-Random-Audit.pdf.

Since that draft report, the County has held two major elections, in June and November of 2006, each using different voting methods and equipment. During these elections the then Acting Alameda County Registrar of Voters Dave Macdonald adopted many of the changes proposed in the draft report. Dave Macdonald has now been appointed as Registrar. New changes to the Election Code will be in force in future elections.

During the November 2006 General Election, as in previous elections, the Election Code required county registrars "to verify the accuracy of the automated counts" by hand counting votes cast at 1% of the precincts and "in one precinct for each race not included in the randomly selected precincts." It further required that there be a paper ballot or a paper record of every vote cast and that the paper record should be regarded as the authoritative record for the 1% sample hand count or for other recounts.

The meaning of the Election Code requirement cited above, 336.5, has changed over time and the Election Code itself has been amended. Further amendments will come into force in future elections. In the past, most voting systems in California used punch cards or optically scanned paper ballots or other methods with a paper ballot and most voters voted at physical polling places. Then the Election Code provision could be carried out in a straightforward way. The ballots were first read and tallied by machine, then a sample of precincts was selected and counted by hand. The hand recount of the 1% sample could genuinely test if the machines and computers that counted and reported the votes cast in the precincts had made errors in counting the vote.

Under these conditions, testing 1% of precincts could be regarded as essentially equivalent to testing about 1% of votes. Absent Votes, that is absentee ballots, were only available to invalids or people who would be out of town on Election Day; nearly everyone actually voted in a precinct polling place. In recent years, changes in the Election Code have permitted anyone to sign up as a temporary or permanent Absent Voter; the numbers of such voters has grown to more than half of all voters. Other innovations have included early electronic voting at the Registrar's Office, and at other locations, even mobile early voting sites. Some precincts are so small that they are not

assigned polling places, so in this election only 825 of 1219 precincts had polling places; voters in the remaining 394 precincts mailed in paper ballots identical to absent ballots.

Every registered voter is automatically assigned to a 'home' precinct determined by the home address at which the voter registers. In the Statement of Vote at the end of an election, every voter's vote has been attributed electronically to his or her precinct. It has not been physically sorted into the 'home' precinct as will be required in future elections.

Application of the 1% of Precincts Provision
This report will discuss how the 1% sample was carried out by the ACROV Office in the November 2006 General Election, but will focus on improvements already made and improvements we recommend or that will be legally required for future elections.

Nine Categories of Ballot Samples. It is helpful to identify nine categories of ballot to be sampled, since each category has been or could be sampled separately. The categories help make clear which ballots are combined and counted and sampled together. In November 2006, the ACROV hand recounted a 1% sample that included all but one of these categories or types of ballots.

1. Sample of 1% of precincts. All ballots cast and recorded at the 825 precincts with polling places were part of the sample. Each polling place was equipped with one scanner for paper ballots and one touch screen machine designated primarily for use by disabled voters. Thus the 1% sample included both paper ballots scanned at the polls and the paper records of votes cast on touch screen machines at the poll. The paper records are printed on a roll, like a large adding machine roll. They are known as the VVPAT, the voter verified or verifiable paper audit or auditable trail. Nine of the 825 polling place precincts were selected for hand counting. For future elections, Registrar Macdonald plans to expand the categories included in the1% precinct sample so that it will include all or nearly all of the other categories, as changes in the Election Code will require.

2. Supplemental precinct sample or supplemental sample. In addition, the ROV did a hand count "in one precinct for each race not included in the randomly selected precincts," as required by the Election Code. In these supplemental samples, the ROV is only required to hand count the specific race or races that did not happen to be included in the 1% sample of precincts. After the public selection of the 1% samples, ROV staff determined how many races had not been sampled at all and picked eleven supplemental precincts in which to count the omitted races. Registrar Macdonald will continue this practice.

3. AV or Absent Voter ballots & 4. Ballots from mail-in precincts. We list these separately because they have sometimes been treated differently. In the November 2006 Election, the ACROV treated these as a single group. It sampled 1% of boxes of paper ballots, including AV or absent ballots and ballots cast by voters in mail-in precincts, that is, precincts without polling places. There were 663 boxes, each holding about 600 ballots. Seven boxes were randomly selected for hand recounting. This sample was not required by the Election Code for this election.

In future elections, however, the Election Code requires that absentee ballots be sampled as part of the 1% sample of precincts, which may effectively require that absentee ballots be physically sorted into their precincts. The challenges of this requirement are discussed later in this report.

5. Provisional ballots were sampled separately. One of the twenty boxes of provisional ballots was randomly selected for hand recounting. In future elections, these ballots will have to be sampled with their precincts. Registrar Macdonald plans to include these in the 1% of precincts.

6. Paper ballots cast at the poll but not able to be scanned at the poll because, for example, the scanner at the polling place stops working. These were scanned at the ROV Office, then counted and packaged with the precinct ballots and later sampled with their precinct. Registrar Macdonald plans to include these in the 1% of precincts.

7. Damaged ballots are usually absentee ballots, but are often among the last to be processed. Once processed and counted, damaged ballots are stored where the original ballots would have been stored, accompanied when necessary by the replacement or remade ballot, but damaged ballots are separately marked and packaged within that category. For example, a damaged absentee ballot would be stored with absentee ballots. Registrar Macdonald plans to include these in the 1% of precincts.

8. **Write-in ballots** are also treated separately**.** Scanners and touch screen machines record the number of write-in votes, but not the candidates for whom they are cast. Scanners kick out this ballots into a separate container. Ballots with write-in votes are sorted out for examination by staff. Votes for **qualified** candidates, that is, candidates who have properly signed up with the appropriate election officials, are counted and are hand-entered into the vote count computer. Consequently, the number of "write-in" votes is much smaller in the official Statement of Vote than in the unofficial tally.

We recommend that Registrar Macdonald complete the count of actual write in votes and include only the valid votes in the unofficial report of votes that he will publish immediately before taking and counting the 1% sample.

9. Early Ballots. The ACROV did not take a 1% sample of votes cast on touch screen machines at the ROV Office or other mobile or fixed early voting locations, instead he recounted 100% of these votes. Those cast at polling places were sampled as described in 1 above. The Election Code will require a hand count of a 1% sample of early ballots in future elections, either as a separate sample or as part of the sample of precincts.

For the November 2006 election, the Board of Supervisors had instructed the ROV to do a recount of all electronic ballots. To carry out this task, the ROV used a scanner method to scan barcodes on the VVPAT paper rolls rather than hand counting. This method will be discussed below. In future, Registrar Macdonald plans to sample and hand count all touch screen votes using the votes recorded on the VVPAT rolls and not the scanner method.

We recommend that Registrar Macdonald include the Early Ballots both in the unofficial report of votes that he will publish immediately before taking and counting the 1% of precincts or, if he treats this as a separate 1% sample, he will, at the same time, publish an unofficial report of Early Votes.

What the Manual Tally Sampled

At this election most ballots, more than 400,000, were cast on paper ballots, either at polling places or as absent or mail-in ballots. [The ROV Office reports that only 3639 early electronic votes were cast and very few were cast at polling places, so we'll use 4000 as the estimate of electronic votes out of the total of 415,638 cast.] Although we distinguished nine categories of ballots above, all ballots were cast in one of two ways—on paper or on touch screen machines, also known as DREs or Direct Recording Electronic voting machines. Ballots were counted electronically in two different ways on two different types of equipment. Paper ballots were scanned and the totals recorded electronically either on scanners at each polling place or on high speed scanners at the ROV office. Touch screen ballots were recorded on electronic memory devices in the touch screen machines at each polling place or at the early voting sites. DREs also produced VVPATs, written records of each vote that the voter could read through a plastic window before finally casting his or her vote.

Challenges of the Election. In understanding what the manual tally entails it is important to understand the physical and other circumstances in which the 1% recount takes place. For the November 2006 election, each voter in Alameda County voted on 11 state partisan offices, 5 state judicial offices and a number of district, city and other offices, on 13 state ballot measures and on a number of local ballot measures, for example, in Berkeley, 7 measures. These items required the backs and fronts of two large card stock ballots measuring approximately 10 by 16 inches. On the touch screen machines voters had to key through multiple electronic screens to see and vote on all the races. The Alameda County ROV Office had to keep track of **113 different races on 149 different ballot types.**

The Post-Election Canvass: 28 days to complete and report the vote to the Secretary of State. The vote totals reported on Election Night only include those that have been scanned before or on Election Day [a. below] and those that are reported electronically during Election Night [b. below]. Although most AV or Absent Voter ballots came into the ROV before Election Day and could be processed before Election Day, an additional 723* arrived or were turned in at the ROV office or polling places on Election Day and thus had to be processed and scanned at the ROV during the post-Election Canvass. Nearly 20,000 Provisional ballots were accumulated at polling places; they needed to be verified and then processed and scanned. In some cases, the scanners at polling places didn't work properly to scan and record the votes. Unscanned ballots were delivered to the ROV and had to be scanned during the Canvass. The final Statement of Vote is reported to the Secretary of State by 28 days after the election. [c. below]

*This number was reported to the authors by ROV staff, however, in conversations. Registrars Dave Macdonald has remarked that several thousand were turned in at polling places. The ROV does not keep an official count of the number of absentee ballots turned in at polling places nor arriving at the ROV Office on Election Day. For the purposes of estimating work burden and flow, the exact number does not matter.

We use this following chart to provide rough estimates of the work required to process paper ballots before and after the election.

Vote Reporting Election Day and Election Night vs Final Vote Tallys
As reported by the Alameda County Registrar of Voters

Type	Time Reported	No. Precincts	Ballots Cast	% Total
a. Absentee + VBM [Vote By Mail] + *some Early Votes*	**11/7/06 8:19:27 pm**	**394 of 1219**	**130,829**	**31%**
b. Totals by End of Election Night	**11/8/06 1:41:52 am**	**1201 of 1219***	**300,286**	**72%**
c. Totals in Final 12/05/06 Statement of Vote [from ROV website]		**1219 of 1219**	**415,638**	**100%**
d. Number of Votes Counted after Election Night [c –b]			**115,352**	**27%**
e. Number of Ballots Processed in some way after Election Day [c-a]			**284,809**	**69%**

*Note: Essentially all precincts delivered their ballots and electronic recording devices promptly after the close of the polls. The ROV decided to stop issuing reports and send workers home after a very long day before all records had been publically reported. Thus item d. is an overestimate, because the electronic reports of the remaining precincts were added to the electronic total very quickly the following day and did not require physical recounting. On the other hand, provisional ballots, absentees delived on Election Day, damaged ballots and paper ballots that did not get scanned at the polls did need to be counted at the ROV. So for our purposes, we'll assume the numbers are roughly correct.

Heaps and Heaps of Ballots; Limited Space; System Improvements.

After Election Day, about 115,352 pairs of large cardstock ballots, 27% of all ballots cast, [d above] still remained to be counted. Logistical challenges for the ACROV were great. But these ballots were only part of the mass of materials that arrived in the Office Election Night and the following days and had to be handled and processed in various ways during the Canvass. Using the chart above, we can see that 284,809 or 69% of the pairs of large cardstock ballots came into the ROV Office and had to be handled and dealt with in some way. In addition, all records, paper and electronic, of the votes and much of the paraphenalia of the 825 polling places were inspected, checked, processed, and prepared for filing or storage following a range of specific procedures.

Acting ROV Dave Macdonald had brought to the Office streamlined and improved systems for planning, coordinating and carrying out the 1% count and all aspects of the election. These improvements helped the Office deal with these challenges, as well as with the earlier challenges

presented by the late purchase and arrival of brand new election equipment and software and the resulting tight pre-election schedule.

In addition, the awkward and limited back office space and computer room, where much of the election Canvass takes place, had been cleared out and reorganized to improve work conditions and efficiency. These improvements helped the ROV Office to deal effectively with handling and processing the heaps and sacks and boxes containing the very large number of large and heavy card stock ballots and all the other records and materials delivered to the Office Election Night or on the days following the election.

Descripton of the Manual Tally

Notification. The date of the Manual Tally itself was announced well in advance on the ROV website as Monday, November 20, 9 am, at the ROV Office. Interested citizens who inquired were told that the selection of the 1% of precincts would probably take place on the Thursday or Friday before that date. Interested members of the ROV's Citizen Advisory Committee and others had been asked to give their names and contact information to the ROV's staff. Staff notified the list of about 20 people by telephone in the late afternoon of Thursday, November 16, that the drawing would be the following day, Friday, 17 November, at 4:30 pm in the ROV Office. The drawing ultimately took place in the Jury Assembly Room 100, on the first floor of the County Courthouse, just upstairs from the ROV Office.

The Drawing. About a dozen people assembled for the drawing. County staff included Acting ROV Dave Macdonald, Senior ROV and IT staff, Tim Dupuis, Charles Coram, Cynthia Cornejo, Xioneida Castillo and Nancy Fenton, Deputy County Counsel. Public observers included members of ROV advisory committees, the League of Women Voters, other election groups and University of California faculty and graduate students.

"A Public Polling Place List for November 7, 2006" was distributed to observers.
All precincts that had polling places were listed in numerical order, with their ballot type and city. Each was also assigned a number from 1 to 825. [The total precinct number of 1219 includes many VBM or vote by mail precincts]

Equipment and Process: A metal drum and ten ping pong balls, each marked with a numeral from 0 to 9 were the tools for the selection. Before each drawing of a ball, Tim Dupuis rotated the drum by its handle a varying number of times to mix up the balls. A ball was selected. Each numeral was written down on a sheet, moving from left to right, to compose a three digit precinct number. Each ball drawn was replaced in the drum before the next drawing.

One percent of precincts was drawn as follows:
773, Fremont; 158, Oakland; 648, Pleasanton; 632, Livermore; 658, Pleasanton; 038, Berkeley; 228, Alameda; 116, Oakland; 138, Oakland. Twice in succession a "9" was drawn as the first numeral, and each time the ball was replaced and a replacement ball was drawn, since no precincts began with 9.

One percent of boxed ballots was drawn as follows:
Observers were informed that there were 663 boxes of paper ballots, that each contained approximately 600 absentee and other paper ballots [representing the votes of about 300 voters], that counting of all ballots was almost complete and that the number of boxes in the draw would be sufficient to hold all as yet uncounted ballots.

Numbers drawn were as follows: 084, 252, 267, 109, 399, 663, 626. As in the earlier drawing, when a 9, an 8, or 7 were drawn as the first numeral, the ball was replaced and a new ball drawn.

One percent of the 20 boxes of Provisional ballots was drawn as follows:
Box 005 was selected.

Staff informed observers that counting would begin on Monday morning at 9. The Election Code requires that, for each race which isn't represented among the initial 1% sample, additional precincts must be chosen to cover those missing races. Observers were informed that staff would decide over the weekend which additional precincts would be added to ensure that all 113 races on the 149 different ballot types were represented. The selection of these additional precincts was not random.

Early voting totals from electronic machines at the ROV Office, various city offices and roving early voting sites were not sampled, because, as mentioned above, 100% of all touch screen ballots, including both early votes and those cast at the polls, were hand scanned to comply with a request by the County Board of Supervisors.

How the 1% was Counted in Alameda County

The following description is based on the comments and e-mail communications from several observers and from ROV staff.

On Monday, November 20 at 9:45 am several observers had assembled at the sign-in desk of the ROV Office. They were asked to sign in and wait until everything was ready.
Observers were given ID badges and "Alameda County Registrar of Voters Election Observer Ground Rules" [rev.11706]. The emphasis in the handout was that observers must not talk or disturb the count in any way.

No handout explaining the 1% procedures was provided to observers, although "Procedures for 1% Manual Tally," a 2 page description of the protocol, does exist and had been provided at other times to the ROV Election Advisory Committee. Staff did not have available for the observers printouts of the provisional Statement of Vote results for the selected precincts or boxes. Supervisors were provided during the day with the printouts for the precincts about to be counted, essential to checking the results of the hand counts.

A staff member led the observers through the office to the back room where counting was already taking place. Three observers were present. Dave Macdonald explained that staff had already picked 11 additional precincts to ensure that all 113 races were sampled and counted. Managerial staff present included Xioneida Castillo, Cynthia Corneijo, Nancy Fenton, Deputy County Counsel and a sheriff's deputy. Xioneida Castillo gave observers little American flags to wave to attract a supervisor if they had questions. Observers were led to a row of seats behind a rope along the window looking into the computer room. Stacks of ballots were already in place on tables. Work had already begun by teams of three seated at about 15 tables.

As the ACROV "Procedures for 1% Manual Tally" specifies, the workers were organized in recount boards, or teams, of three. In each recount board, one worker reads out a vote from a ballot; the two others each mark the vote on a tally sheet in the specified manner.
They appeared to follow the "Alameda County Registrar of Voters Procedures for 1% Manual Tally." When the two counters have completed recording votes for a candidate or race, they compare their totals. If they agree, the supervisor is called over to see whether the total matches that on the electronic print out. If it does not, the recount board redoes their count.

The procedures were very similar to those followed during the November 2005 election, but observers were more constrained. Staff and handouts emphasized control, order and quiet, which helped the recount boards do their work, but did not help make the process comprehensible in a meaningful way to observers. Supervisors did respond cheerful and courteously to all questions from observers. At the same time, staff and supervisors communicated with each other in very low voices, so, although observers could see what was going on, they were not able to actually follow the content of the activity. This was the case even for tables close to the observers; activities at the far end of the room could not be followed at all. In particular, observers could not hear the totals that each counter announced for a particular candidate or race, could not hear whether the two counters agreed and could not hear whether the supervisor confirmed that the total arrived at by the counters matched the total from the electronic report of the vote for that precinct or box and that candidate. The expressions and actions of the staffers did of course generally convey whether the totals matched, since otherwise the counters were likely to begin to check the number of ballots in the already counted pile, sort them into piles of 10 if they had not already done so, and begin the recount process again.

In post-election discussions, a supervisor explained that in earlier recounts the high noise level in the room of 12-15 recount boards reading totals aloud had made it difficult for the other recount board members on each board to hear what was being read to them. Consequently, supervisors had asked all recount board members to speak more quietly.

In so far as observers could tell from the behavior of the staffers at the closest tables during the time they observed, it did not seem that the supervisors were treating the electronic totals as the 'right' totals, the ones the recount board should be matching. Since the hand count is the legally binding count, it is essential that supervisors keep the electronic totals secret from the recount boards while they are working and not hint or suggest that the recount boards "try" to get the "correct" total.

One or another supervisor walked around and looked at boxes waiting to be recounted or being counted so she could have printouts made of the precinct and box vote provisional totals.

Supervisors brought each table an envelope of write-in votes to count separately. Some recount boards counted faster; some were slower. Some counters did not divide the ballots into stacks of ten or found they miscounted their stacks of ten ballots.

Tuesday, November 21, 11 am. The hand counts and the physical arrangements continued as described above, with a Sheriff's deputy on duty, but the Associate County Counsel not present. Supervisor Xioneida Castillo reported that 3 precincts remained to be counted.

Nancy Bickel asked for and received printouts of the electronic results from the precincts that were being counted, as did a few other observers. Printouts she received included [listed in order selected in draw] : Precincts 773 [Insight scanner], 648 [Edge DRE], 632 [Insight], 658 [Insight],228 [Insight],116 [Insight]; Bickel did not receive any reports from 158 and 038, did not receive the Insight report for 648, did not receive the Edge reports for any precinct except 648.

Print outs of AV Boxes 84. 267, 109, 399, 663, 626 were received; a print out for AV Box 252 was not received by Bickel. A print out for provisional box 5 was received.

Supplemental precincts 684, 19, 260, 35 were received; a staffer responded to Bickel's question saying that 11 supplemental precincts had been picked: 202500, 204100, 207100, 260100, 323200,440400, 456600,470600, 542000, 82200, 666800. Nancy Bickel requested the precincts missing from her pack and undoubtedly would have received them had she not had to leave before they were delivered.

Hand count of touch screen VVPATs. Very few votes were cast on touch screen machines at any of the polls, for example, the Edge DRE report for Precinct 648 showed one vote cast. None of our observers happened to see the hand count of any touch screen votes that may have been cast at the sampled precincts. Staff assured us that the few votes in question were read and counted by hand.

Impossible to follow the tally. Even if observers had had the printouts of the vote totals for the boxes and precincts being recounted from the start of the recount, they would not have been able to follow the recount, since the counting and checking of totals was being done in low voices and were not posted in any way for the observers. The lack of printouts and lack of announcement or posting of results meant that observers were not able to know whether or how many inconsistencies were found between the hand count and the electronic results.

100 % Recount of all VVPATs from the election. The Board of Supervisors had directed the ROV to do a recount of all electronic votes cast in the election. Approximately 4000 votes were cast electronically, most of them during early voting. The VVPATs, printed on adding machine type rolls, are awkward and difficult to handle and probably rather difficult for staffers to read through and record accurately. The process of reading through all the races on 4000 such ballots would be time consuming.

Acting ROV Dave Macdonald had arranged to print barcodes on each of the votes cast. Instead of reading and announcing each of the entries on the VVPAT printed records, the staff used a scanner to read the barcodes. Equipment and the system had been borrowed from Clark County, Nevada. Macdonald reported that, before the election, he had tested that the barcode correctly recorded and the scanner correctly read the barcodes. The barcode was generated by the same software that generated the VVPAT records. He reported that the software for this methodology is open source

and created by Clark County. Staffers used paint rollers to hold the VVPAT rolls, an ingenious way to make it easier to hold and unroll the VVPATs.

How many citizens observed the 1%? A quick inspection of the sign in roster in the ROV's office near the end of the 1% count showed fewer than 50 signatures for the whole post-election period. Nine of the 50 visits were from one of the authors of this report and it's likely that other individuals also observed more than once.

DISCUSSION

As we noted in the Summary, some of the practices we propose are currently required or will be required for future elections by the Election Code; others add to or amplify the Election Code requirements in 336.5 and in 15360 as amended and filed with Secretary of State, Sept. 30, 2006. Many of the Committee's recommendations agree with those of other advocates of election reform. Since the draft version of this report of February 2006, the ACROV has adopted in whole or part many of its recommendations, as have Registrars in other counties.

Note: The Registrar's responses to our recommendations are included and discussed in the Summary at the beginning of this report. A copy of the complete letter is included as an appendix to this report. Consequently, we will only refer to them briefly below when necessary to give a correct account.

1. Random. The precincts or other units should be chosen at random.
Election Code 15360 (c) states that the Secretary of State specify approved methods for selecting the 1%, whether random number generator or other method. This report suggests several possible methods, including drawing balls from a tumbler and throwing special dice. A full description of the special dice method appeared as an appendix in the draft version of this report. The draft report, presented in February 2006, may be found at http://www.countedascast.com/docs/Principles-Criteria-For-Random-Audit.pdf.

sWe find that the test used by the ACROV at the November 2006 election was random. Therefore, we recommend that the ACROV request the Secretary of State to approve the method used by the ACROV in the November 2006 election. Registrar Macdonald intends to use this method for future elections.

In general, we recommend that the Secretary of State encourage the use of physical, visible, easily understood random methods, rather than a non-transparent method such as a computer random number generator. For most citizens, the election process as a whole is not transparent, so having a transparent test is particularly appropriate. [See practice 7 below.]

By contrast, one method that is transparent, but almost certainly not random, is the method used by San Francisco in the November 2006 election. " Index cards each with one of 561 precinct numbers were put into a box. Six members of the public choose the six precincts (1% of 561 precincts, rounded up). Precincts 3520, 3022, 3924, 2417, 3809, and 3836 were picked in that order. The precinct numbers started at 1101 and ended at 3937. Higher numbers were generally chosen. I think this was because people had a tendency to grab a card more towards the top, and because the cards were put into the box in order starting with the lowest numbers. By the time they were finished, the box was nearly full; so there wasn't enough room to shake the cards around much [and] they only shook for a couple seconds." [Chris Jerdonek, e-mail communication, Nov. 22, 2006.]

Test the Method. Any sampling method used should be tested for randomness before and/or after it is employed, since methods can be fair and random in principle, but flawed in practice. For example, a specific tumbler may have to be turned a specific minimum number of times to ensure

adequate mixing of balls of a certain size and weight or dice could be unevenly weighted and thus unfair.

Registrar Macdonald stated in his letter responding to our recommendations that "a comprehensive review of the selection process has been previously completed." We do not know the details of this review.

One Percent of what? We would like to draw readers attention to the fact that 1% of precincts is not necessarily exactly the same as 1% of ballots. We discuss the issue under practice 9 below.

2. **A genuine and independent test.** The purpose of the hand count of the 1% sample is "to verify the accuracy of the automated count." We understand this to mean that it should be a genuine and independent test or audit of the accuracy and completeness of the official Statement of the Vote. The test carried out by the ACROV met this standard.

3. A comprehensive test.
Every single vote cast and counted in the election should be included in the pool or pools of votes sampled. Every vote cast should thus have at least a 1% chance of being drawn and hand counted in the sample.

In the November 2006 election, the ACROV nearly met this test, since it seems to have included almost all ballots and every category and type of ballot in one of the three random samples—of precincts, of absentee and mail-in precinct ballots and of provisional ballots.

As far as we are aware, the only ballots not included in any of the three samples were the approximately 4000 searly ballots cast on DREs. Because the Board of Supervisors had requested the ROV to do a recount of 100% of VVPATs, the ROV Office did a hand scan of barcodes on all of the VVPAT ballots, which constituted a complete check of these ballots. We do not regard this scanning method as equivalent to doing a hand recount, since the recount boards did not read and count the names of the candidates and the measures that the voters had actually had the opportunity to read before casting their vote. They would not have been able to read the barcodes and confirm that the barcodes correctly recorded their desired votes. At the same time, hand counting all 4000 VVPATs would have been a time-consuming, onerous and probably pointless task.

ACROV Macdonald has stated that he does not intend to use the scanner method to do the recount of the 1% sample of VVPATs in future. For the VVPATs in the 1% sample of precincts, an actual hand count was performed. Registrar Macdonald plans to include all or nearly all categories of ballots in the 1% sample of precincts in future.

4. **1% sample should be selected and counted after all ballots counted.** To ensure a comprehensive, a genuine and an independent test, the 1% sample should be selected and the audit carried out only after all ballot counting is completed.

The ACROV came very close to meeting this practice, since very few ballots were still being processed and counted when the sample was selected. As we understand, all counting had been completed by the time the selected precincts and boxes were actually hand counted. Meeting this standard will be difficult in future elections because of the burden of meeting the new Election

Code requirements to include all absent voter ballots. We assume that all all mail-in precincts, as well as provisional ballots and all damaged and remade ballots would also be included in the hand count of the 1% sample, as discussed below.

Registrar Macdonald has said that he will try to meet this standard, but can not commit to doing so because of the time and volume pressures we have discussed in the Summary and throughout the report.

The following two practices will be discussed together.

5. The preliminary Statement of Vote published and printed before the 1% is selected. The SoV should be "frozen" before the random sample is selected and the audit is begun. No changes should be made to the Statement of Vote after the 1% audit is begun, if it can possibly be avoided. Copies of the preliminary SoV should be given to ROV supervisors before the 1% sample is selected. As proposed in practice 7e below, it should also be provided to observers (e.g., on CD-ROM), or made available on the ACROV web site in advance so that observers have a chance to download the preliminary SoV before attending the 1% sample selection.

6. Precincts and other units sampled must match those published in the preliminary and final Statement of Vote, so that the results of the hand count can be exactly compared to the preliminary results.

If the categories from which the 1% hand count are selected and counted are exactly the same as the categories reported by the Registrar of Voters in the Election Summary Report and in the preliminary and official Final Reports and Statements of Vote, the ROV and public observers will be able to recognize immediately any discrepancy between the hand and machine counts and seek and find its cause.

For the November 2006 General Election, the Election Code only specified a 1% sample of precincts. As we described, the ACROV Office gave a broad interpretation to this requirement. It sampled precincts with polling places, selected a 1% sample of this precincts and handcounted both paper ballots and the few touch screen votes cast in those precincts. It also sampled boxes of paper ballots, thus including absent voter and mail in precinct ballots; and it separately sampled boxes of provisional ballots.

The ACROV did not publish and print the full preliminary Statement of Vote before the selection of the sample nor freeze the Statement of Vote, on, for example, a CD that could not be altered—as far as we are aware**.** On the morning when the sampled precincts and boxes were to be counted, before and during the time the recount boards were doing their work, the staff was printing out individual reports of the votes recorded for the selected boxes and precincts.

The chart below compares the two data from the two formats. The individual reports were naturally laid out very differently from the Final Statement of Vote for the whole election. In the individual reports, the data were sorted by precinct or box instead of by race. Since boxes of absent voter ballots will not be separately sampled in future, we'll focus our discussion on precincts.

The most important feature to notice is that the totals for candidates for governor shown in the report for any particular precinct in the final Statement of Vote do not match the totals for that precinct shown in the report printed out for the 1% Tally.

The chart below shows data for precinct 138, as printed out in the "Machine Report 1% Manual Tally Precinct 22460" and used by ROV staff to check totals. It compares the data given in that format with the data given in the web-published official Statement of Vote. Column labels and candidates names follow the order in the Statement of Vote as indicated by the headings. For the purpose of this discussion, ignore the Absentee Reporting, since the ACROV sampled these separately by boxes not precincts.

Statement of Vote

12/04/06 4:00 PM
November 7,2006

ALAMEDA COUNTY Statement of Vote
GENERAL ELECTION

GOVERNOR

9800002

	Registration	Ballots Cast	Turnout (%)		ART OLIVIER	JANICE JORDAN	PETER MIGUEL CAMEJO	EDWARD C. NOONAN	PHILANGELIDES	ARNOLD SCHWARZENEGGER			
224600 53503	850	249	29.29		2	2	27	0	151	55			
224600 - Absentee Reporting	850	379	44.59		4	2	24	1	247	90			

Machine Report 1% Manual Tally Precinct 22460
Data for candidates for Governor

2	**2**	**25**	**0**	**138**	**50**	**1 write-in**

The categories of votes included in the two reports were not the same, so the totals do not match. Camejo, Angelides and Swartzeneger all show fewer votes in the Machine Report for the 1% Manual Tally than in the final Statement of Vote. The write-in vote noted in the Machine Report is not shown in the final Statement of Vote. The categories of votes known to us to not be included in the Machine Report generated for the 1% Manual Tally were: Provisionals, which were sampled separately, and Early Voting, which was not sampled as part of the 1%. Write in votes reported initially often turn out not to be votes for certified write-in candidates and therefore they are not counted in the Statement of Vote. Lacking further information, we'll assume that votes in these two categories accounted for the differences between the two reports. The details are not important for this example.

What is significant about this example is that, when the 1% does not sample exactly the the same group of votes as is reported in the official Statement of Vote, it is impossible for ROV staff or observers to verify that the 1% audit was successful and that the 1% audit provides evidence of the official election results as published in the official Statement of Vote. ROV staff know the details of how each version differs, so they can reconcile the apparent contradictions. But citizens will be puzzled and wonder why they do not agree.

At the very least, the official Statement of Vote, or a preliminary Statement of Vote or an unofficial report of votes, should be published and frozen before the 1%. If the two do not cover the same categories of ballots, they should also include a supplemental Statement that exactly matches what is sampled. The supplemental report of votes or Statement of Vote should make it crystal clear to the interested citizen that, for example, when she adds categories x, y, and z in the supplemental SoV, she gets exactly the same total as in the appropriate corresponding portion of the main report or Statement of Vote.

A special Machine Report of each of the selected precincts or boxes printed out just for the 1% can not give an observer the same confidence as a full preliminary Statement of Vote.

In future elections, there should be fewer opportunities for such puzzles. The preliminary reports of votes cast will include all or nearly all categories of ballots. The Election Code requires that absent voter's ballots be included in the 1% sample of precincts and that early votes cast on direct recording electronic voting systems at the ROV or satellite locations be sampled either as part of the 1% sample of precincts or in a separately drawn 1% sample.

According to Registrar Macdonald, in future the precincts sampled would include all precincts, currently 1219, not just those with polling places, and the 1% sample of precincts would also include provisional ballots, damaged ballots and other categories of ballots, even those that have been traditionally processed very late in the Canvass**.** Then all ballots should theoretically be able to be counted and included in either the 1% sample of precincts or a separate 1% sample of early votes and therefore be sampled for a manual tally. But there will be very significant practical barriers to doing this successfully.

Time and Volume Obstacles to Meeting Recommended Practices 1-6.

The Alameda County Registrar of Voters and indeed Registrars in most counties will face great practical obstacles to carrying out the Post-election Canvass and reporting the final Statement of Vote within the 28 day period specified in the Election Code. Carrying out the recommended practices for the 1% manual tally discussed above will be only a small portion of the problems Registrars will face.

The new Election Code requirement that absent voter's ballots should be included in the 1% sample of precincts sounds simple and sensible. It can also greatly improve the validity of the 1% sample. However, it presents formidable practical problems.

The enormous volume of card stock ballots that had to be handled, processed, moved, scanned and stored in the November 2006 election taxed the space and permanent and temporary staff resources of the Office. During that election, the ACROV was able to process, scan and pack up all the absent voter ballots that came in before Election Day, so that they were out of the way. On Election Night, a huge flood of ballots poured into the ACROV Office:

large red bags of ballots voted and scanned at the 825 polling places
extra bags of ballots voted at the polls that weren't able to be scanned at the polls,
envelopes of provisional ballots
sacks and piles of absent voter ballots turned in at the polls

as well as electronic memory devices, voter registers and other materials and equipment.
As pointed out in the earlier table, "Vote Reporting Election Day…," 115,352 paper ballots or 27%, more than a quarter of all the pairs of large card stock ballots, had to be processed and counted after Election Day. In all, nearly 300,000 or more than 69% of ballots had to be handled and processed in some way after Election Day.

With the help of streamlined systems and improved space arrangements, the ACROV managed and kept track of all these ballots and materials well, but people and space were streched to the limit. Large sacks and stacks of ballots were constantly having to be moved.

Before Election Day. The new Election Code provision will mean all of the Absent Voter ballots that come in before Election Day— about 130,829 paper ballots at the past election or an additional 31% of all ballots cast— may not be able to be packed up, sealed and put away as they are processed and before the Election Night flood. Instead they will have to be physically sorted into their 1219 precincts during the month preceding the election; the boxes or files for these precincts may have to be kept open during part or perhaps all of this this period and yet kept secure from tampering or confusion.

After Election Day, paper ballots that have been scanned at the polls will arrive already sorted by precinct and could be packed up as usual. The other categories of paper ballots, listed above, that come in from the polls and that were processed in various ways at various times throughout the Canvass period and then packed up with the absent voter ballots will have to be kept intact in approximately 1200 precinct groups or processed and then again sorted into their precincts.

Doing the 1% Sample and Hand Count within 28 Days and Meeting these Practices. We are confident that the ACROV will come up with workable methods to handle this new challenge, but

the Office will be challenged to do this huge amount of additional processing and to complete all counting of ballots—and still have enough time to do the 1%. It will be particularly challenging to do the 1% and meet all the practices proposed here.

A Note on Sorting Paper Ballots by Precinct. The ACROV has not done this in the past and does not have mechanical or electronic equipment to carry out this task at present. At the time of this Report, ACROV Dave Macdonald has said he thinks they may have to do this manually or with a combination of mechanical and manual sorting. His staff is looking at ways to further rearrange and streamline the limited working space to handle the new requirements. Appendix A includes a short discussion of some proposals currently circulating and some further suggestions.

THE PUBLIC'S ROLE IN THE 1%

All the parts of practice 7 are linked together, so more general discussion will follow.

7. The manual tally should be a public and transparent process. Members of the public observing the process should be able to follow it with complete comprehension; they should be able to hear, see and understand everything that is happening. The intent of the legislature to make this so is clear in the recent amendments to the Election Code. [Section 15360 (d) and (e)] The ACROV did not fully meet this goal in the November 2006 election.

As we report in the Summary, the ACROV reported plans in his letter to the committee and subsequent discussion which greatly improve the transparency of the process. For details refer to the Summary and to the Registrar's letter in Appendix B.

a. Public notice of and public selection of the 1% sample. Five day public notice of the time and place of the selection will be required in future elections. The ACROV process was excellent in enabling the public to observe the selection. However, it gave only one day notice of the selection to those who had requested notice; it did not announce the time and place on its website. This will be corrected in future elections.

A Potential Problem with 5 day public notice: ACROV staff drew our attention to a potential problem. Since the staff cannot know exactly how long all the procedures required in the Canvass will take until they actually do them, and the volume of work is large, they may be forced to announce a date for the 1% selection and counting that would occur before they completed counting all ballots. If they could wait to announce these dates until close to the end of the 28 days of the Canvass, they might be able to schedule it after all ballots have been counted.

Comment: Would the Election Code provision and any regulations published by the Secretary of State permit the ROV to publish provisional dates for the 1% selection and count, with a note that observers should call to confirm the exact date and time?

b. **The selection method should be easy to understand.** We further recommend that the method of selecting samples should be easy for the observing public to understand and verify. The physical selection methods used by the ACROV met this standard nicely; we urge the ACROV to seek certification for the ping pong ball and drum method from the Secretary of State.

c. Public notice of and public counting of the 1% samples with procedures that the observing public can hear, see and understand. The Election Code will require five day public notice for the hand tally in future elections. The ACROV more than met the future five day notice requirement by posting the date of the hand count on its website. The ACROV did not enable the public observers to hear, see and understand the procedures. We urged the ACROV to improve this aspect of the 1% tally in future elections and it appears that he will do so. We propose some further improvements below.

d. The methods for carrying out the sample and the count should be public and publicized in advance of the election. We expect to see the improvements in public notice discussed above in future elections. The Registrar has stated in his letter and in subsequent discussion that procedures will be published on the ROV website in advance.

The ACROV already has written protocols and procedures for the count which have been distributed to its public advisory committee. These written materials can be refined and made available to citizens who come to observe. The ACROV could easily expand its website to make these and similar materials available to the public. In the June 2006 election, the ACROV posted descriptions and flow charts of some of the Canvass procedures on the walls of the room where they were being carried out, an excellent way to inform the public observers. In future elections, where the Office will have more time to prepare and disseminate such materials, we encourage it to do so.

e. The preliminary Statement of Vote for each of the precincts or other units sampled in the 1% sample should be published and made available to the public before the sample is selected, so that the observing public can follow the process step by step.

Once the ACROV is able to meet practices 5 and 6 above for its own use, it will be an easy further step to make the same materials available to interested members of the public in advance of the tally—either on paper or on CDs or in other electronic formats including the website.

At the least, the report should show the latest unofficial vote tallies, which are regularly published by the ROV throughout the Canvass period. This report should include all votes counted so far, with the polling-place vote totals broken down by precinct, using the same format and same categories as will be used during the random selection of precincts. This is the approach that the Registrar has not ruled out, even though, in his response to our letter, he said he would not print a preliminary Statement of Vote.

The report should be published in electronic form (e.g., as a .CSV file). The report could be provided to all interested observers shortly before the random selection, or it could be made available on the ACROV web site the evening before the random selection. Staff could also take the opportunity to archive these totals to read-only media (e.g., CD-ROM).

We recognize that making such a report available adds another step to a time-sensitive operation. Nonetheless, we recommend that this be done so that observers (and county staff) can be sure that the tallies do not change after the 1% precincts are selected. This serves as an important step to assure the security, transparency, and integrity of election results. For instance, if skeptical observers did not trust the voting equipment, they might ask whether it is possible for vote counts on the main database to be changed after the random selection (e.g., by malicious code in the

voting software), in a way that uses knowledge of which precincts were selected to avoid detection. While this threat might seem far-fetched, making the latest precinct-by-precinct vote totals available to observers before the random selection ensures there can be no possibility of such an attack. This recommendation ensures that such shenanigans are completely impossible, so there can be no question of such a thing. We recommend making these unofficial totals available before the random selection.

Ideally, the random selection process would not begin until all votes had been counted. This makes it possible to publish an unofficial report showing all vote totals before the random selection, and to ensure that this report is complete and includes all votes. It means that the vote totals that are audited will be the same as the vote totals which are certified, which is important.

Timing between the drawing of the Sample and the hand count
In November 2006, the random selection was held on Friday and the manual recount did not begin until Monday morning. In addition, containers of ballots and VVPATs had already been opened and the work of the recount boards had begun when the observers entered the work area.

From an observation and election verification standpoint, it would be better to pull the ballots from the selected precincts and begin the manual counting immediately after the random selection, This would make it easier to verify that the ballots were not handled, manipulated, or changed after the random selection. In particular, it would make it easier to verify that nothing had a chance to affect the selected precincts that might not have affected those not selected. This would enable observers to see for themselves that the selected precincts are representative of the county as a whole.

As a secondary consideration, it would also make it easier for observers to see both the random selection and manual counting in a single day. (As for the extra precincts that are selected to ensure that every contest is recounted, the choice of these extra precincts could be performed in parallel after the manual recounting was underway, so that it did not delay the manual counts.)

This change may or may not be compatible with the ACROV's workflow. It is worth considering. If for any reason it is not possible to begin the manual count immediately, then we encourage the ACROV to think carefully about how it can demonstrate to observers that the ballots were not handled, manipulated, or tampered with between time of the random selection and when they are manually counted. For VVPAT records, the ACROV should pull the selected VVPAT canisters and show to observers that the security seal on the VVPAT canister remains intact. For paper ballots, it would be good to show observers that the seal is intact before the manual counts are begun. If seal logs are kept in sufficient detail to be able to verify that those containers were not opened between the time of the random selection and when the manual counting was begun, these seal logs could be shown to observers, too.

Underlying Principles

All of the measures to improve public information about and understanding of the 1% sample and hand tally in practice 7 above and in Practice 8 below are intimately linked. Some will be required by the Election Code; others we regard as logical corollaries of the specific Election Code provisions and of the ideas underlying the Election Code. More broadly, they are founded on the basic principle of our democracy that the government's purpose is to serve the people. The public

therefore have a right to know how we elect our government and to be assured that it is done honestly and accurately so that we can maintain a healthy democracy.

Different Institutional Practices and Attitudes

Registrars of voters in different counties have developed a range of different institutional practices in carrying out the 1% sample and manual tally. We were particularly interested in looking at whether different Registrars made it possible for public observers to see, hear and understand what was happening. In one large county, San Francisco, and one smaller county, Yolo, observers found that the ROV offices had a very open attitude to public observers.

> In San Francisco, you can go right up to the table at which the team of three or four is working and listen to them go through the contests one at a time. The counters read off what each ballot says, one at a time, while another person tallies.
>
> [Chris Jerdonek, e-mail communication]

One of the authors, David Wagner, observed the 1% manual tally in Yolo County. He noted that one thing they did very well was enable observers to see the entire process from up close. Observers were welcomed and encouraged to walk around the room freely, to walk up to the counters and watch over their shoulder from up close, to see the ballots as they were being counted, to see the tally sheets, to listen as workers were instructed by supervisors, and so on. Of course, observers were admonished not to touch or interfere with the counting in any way, and were told not to speak to or interrupt the workers and to avoid getting in the way. Supervisors were on hand to answer questions; observers were asked to direct questions to a supervisor. When asked "Isn't having someone stare over your shoulder distracting?" the answer was that they were used to it and they pretty much ignore it. The atmosphere in Yolo County was thoroughly welcoming towards observers. [Wagner's full observations may be found in *Notes on the 1% Manual Tally in Yolo County* on the Yolo County Elections Office webpage at http://www.yoloelections.org/.]

ROV institutional practices developed and changed over time for various reasons. Registrars with more restrictive practices may have developed them to improve efficiency, to make the best possible use of limited available time, space and staff or to avoid past disruptive encounters with members of the public. The tight control that the Alameda County ROV Office exercised over public observers in November 2006 was an extension of the practices observed in November 2005. It may also have reflected recent experiences of complaints to the Board of Supervisors, lawsuits and criticisms of the ROV in the press. Institutional practices and traditions do not change easily.

At the same time, the Election Code requires many of the activities and processes of the election to be public—to be observed by some specified or all members of the public. This is clear in the Election Code passages we have quoted in this report. A now outdated section of the Election Code provides an excellent snapshot for understanding what the legislature has understood by the concept of public observation. Election Code 19380 describes how vote counting should be carried out when machines at polling places were like mechanical adding machines that showed totals, but did not print them out. Underlined words appear as in the on-line text.

> 19380. During the reading of the result of votes cast, any candidate or watcher who may desire to be present shall be admitted to the polling place. The proclamation of the result of the votes cast shall be distinctly announced by the precinct board who shall read the name of each candidate, or the designating number and letter of his or her counter, and the vote registered on the counter. The board shall also read the vote cast for and against each measure submitted. …
> During the proclamation ample opportunity shall be given to any person lawfully present to compare the result so announced with the counter dials of the machine, and any necessary corrections shall then and there be made by the precinct board, after which the doors of the voting machine shall be closed and locked.
>
> … 19384. The precinct board shall, before it adjourns, post conspicuously on the outside of the polling place a copy of the result of the votes cast at the polling place. The copy of the result shall be signed by the members of the precinct board….

8. Identify, resolve, explain, publish discrepancies. The Registrar of Voters should publish in advance its method for handling any discrepancies that may be discovered during the 1% audit. The Election Code requires that in future elections the ROV publish a report on the discrepancies found and an explanation of their resolution.

> …include a report on the results of the 1 percent manual tally in the certification of the official Canvass of the vote. This report shall identify any discrepancies between the machine count and the manual tally and a description of how each of these discrepancies was resolved. In resolving any discrepancy involving a vote recorded by means of a punchcard voting system or by electronic or electromechanical vote tabulating devices, the voter verified paper audit trail shall govern if there is a discrepancy between it and the electronic record. Election Code 15360 (e)

The report would not need to include any erroneous tallies, where two counters on the counting board got different answers, but once both counters on the recount board get the same answer and present it to the supervisor, it would make sense to call that the initial manual tally and resolve any discrepancies there. Most or all of the discrepancies will be innocuous, but this may help identify opportunities for improvement in future elections and establish a positive feedback cycle that permits continuous improvement of election accuracy. We believe that the ACROV generally follows this practice internally already. The only change that would be required would be to publish both the procedures and the results of the procedures.

No Discrepancies in the 1%. Why? The ACROV reported no discrepancies between the preliminary Statement of Vote and the results of the 1% hand count. San Francisco also reported no discrepancies, using equipment from a different vendor. [Chris Jerdonek] This is surprising and deserves some discussion.

Mechanical error minimized by setting scanners to reject potential problems? One potential cause of discrepancies between the manual tallies and the electronic totals from the scanners at the polls or the high speed scanners at the ROV Office could be that any mechanical device may not operate perfectly. Scanners are mechanical devices with computerized or electronic controls to catch errors, but even the best machine can have momentary failures. In the case of scanners, we could hypothesize, for example, that two ballots might be fed into a machine at once or stick together and that the scanner might then "see" and record only the top of one ballot and the bottom of the other. Or a voter might mark two candidates as his choice instead of one—an over-vote. In such cases, scanners are supposed to reject the ballot. At the poll, the voter is asked whether he or she wishes to correct the ballot. After the voter changes or declines to change the ballo, it is then

inserted again into the scanner. At the ROV, scanners either stop to avoid counting a problem or "damaged" ballot and/or sort it into a container or pile of problem or damaged ballots to be reviewed by ROV staff, thus catching many or most potential errors. So the lack of discrepancies may be due to scanners that were adjusted to be very sensitive to problem ballots and reject them.

Staff Alert to Fix Problem Ballots? We observed that ROV staff were very careful to study problem ballots, determine the voter's intent and correct or "remake" a ballot so that the ballot reflected the voter's intent. ROV staff worked during the post-election Canvass on what seemed to be a relatively large number of ballots rejected as damaged. The staffers looked for a variety of frequently occurring problems. They used white-out to hide accidental marks and to cover up areas on one side of the ballot where print from the other side showed through. Ballots so corrected were fed again into the scanner; the few that were still rejected were again reviewed by a staffer. Ultimately, "damaged" ballots, ballots rejected by the scanner for whatever reason, were "remade," that is, a team of staffers study the ballot then take an appropriate unvoted ballot and carefully copy the voter's choices on to the new ballot. The "remade" ballot then replaces the "damaged" one. Each remade ballot is stored with its original ballot, so the two can be reviewed if necessary.

Do Recount Boards try to match the totals in the preliminary Statement of Vote?
Some observers, in Alameda County and other counties, have reported or suspected that supervisors might treat the machine count as authoritative and thus might subtly pressure recount boards to match the total reported in the preliminary Statement of Vote. The Election Code and existing ACROV protocols and practice agree that the supervisor must not tell the Recount Board what the SoV result was, but wait to hear the Recount Board's result and then tell them just whether it matches or not. As described earlier, the Recount Board only reports to the supervisor once both recorders totals agree. If their total does not agree with the SoV, the Recount Board then recounts in groups of ten to check its count. The authors of this report have not observed a situation at the ACROV where it seemed that a Supervisor has refused to accept the results of such a repeated recount.

The recount board protocol described earlier is designed to make such an outcome difficult or impossible. With supervisors who understand that the hand count is the legal total and with two individuals on each board marking totals on separate sheets, and a third reading out the numbers and observing the other two, a false agreement would be unlikely. As we described in this report, observers of the ACROV recount in November 2006 could not follow the process adequately to make this determination, but observations in November 2005 by one of the authors found that ACROV supervisors and recount board following the ACROV announced procedures. [Nancy Bickel, League of Women Voters of Alameda County, "How Our Votes Are Counted."]

The following description of the 1% recount in San Francisco shows that supervisors checking totals of recount boards in San Francisco followed procedures similar to those in Alameda County.

> In San Francisco, you can go right up to the table at which the team of three or four is working and listen to them go through the contests one at a time. The counters read off what each ballot says, one at a time, while another person tallies. Afterwards, the totals for each candidate are read aloud to a supervisor. The team does not know what numbers they are "aiming for." If the numbers don't match up, the supervisor has the team start over, again with the team not knowing

> which candidate totals were off. I liked that aspect of the process, because that way the counters can't fudge things just to speed the process up. The supervisor only says "right" or "wrong." [Chris Jerdonek, e-mail communication]

In Yolo County, one of the authors reported that the process was similar to the ACROV protocol and the practice observed in San Francisco, "except in one respect: the initial count is blind, but if the initial count is off, then the supervisor told the counters what number she was expecting." [David Wagner, e-mail communication]

9. **Reconsider whether a 1% sample is adequate to test the accuracy of the ballot.**
This often-raised question could most effectively be considered by the ACROV as part of a statewide discussion among election officials, interested citizens and appropriate technical experts. What changes would be required in the election Canvass to achieve a statistically significant sample size? What would be the costs and benefits to the public to achieving that sample size? Could a sample of such a size be counted within the 28 day Canvass period?

The adequacy of a sample depends upon multiple factors, such as the number of precincts and the number of voters for a particular race included in the sample and the margin of victory in the races, not just a percentage (e.g., 1%). So although 1% might be more than adequate to test say, the accuracy of the vote in Alameda County for candidates for statewide office, it might not give a large enough sample to test the accuracy of the vote in a small local election. To make the question more puzzling, the size of precincts can vary widely, from, say 100 registered voters to 1000, and the number of actual voters in each precinct varies even more widely. So future discussions should consider what the 1% or other sample is taking a sample of. One percent of precincts is not necessarily the same thing as one percent of ballots.

The Larger Context
Sample size needs to be considered in the larger context of the ultimate goal of the sample—to ensure an honest and accurate election. The goal is that every vote cast is counted accurately and that the candidates and measures that win in an election win honestly. Increasing sample size would be intended to increase the likelihood of discovering error or fraud.

Preventing error and fraud from occuring might make larger sample sizes seem less necessary. So citizens and election officials should consider whether the money available to be spent on the election should be devoted to taking and hand counting larger samples or to tightening up all aspects of election management, designing and testing machines and software to prevent error and fraud, improving training of election officials, and increasing the security of the equipment and the process. Although much can be done at the local level to ensure this goal, some of these improvements can only be carried out at the national or state level.

Conclusion

Improved Process

The Alameda County Registrar of Voters Office carried out its obligations to do a hand tally of 1% of its precincts with outstanding orderliness and efficiency, improving on the already excellent standard of the Office observed in the November 2005 Special Election and subsequent elections. Acting ROV Dave Macdonald brought to the Office streamlined and improved systems for planning, coordinating and carrying out the 1% count and all aspects of the election despite the late purchase and arrival of brand new election equipment and software and the resulting tight schedule. The awkward and limited back office space and computer room, where much of the election Canvass takes place, was cleared out and reorganized to improve work conditions and efficiency.

The acting ROV adopted many of the selection practices recommended by the February 2006 Draft **Proposed Criteria for the Post-Election One Percent Manual Tally in Alameda County** prepared for the previous acting Registrar of Voters Elaine Ginnold and the ROV's Election Advisory Committee to improve the effectiveness of the 1% sample in discovering errors or problems in the provisional Statement of Vote.

Expanded Sampling and Checking

The Office expanded its definition of "1% of precincts" by hand counting both paper ballots scanned at the precincts and the VVPATs, the Voter Verified/Verifiable Paper Audit Trails, or paper records printed on rolls by touch screen machines. As in the 2005 election, the ACROV went beyond the selection and hand counting of 1% of precincts. In the November 2006 election the ACROV did separate hand counts of 1% of the boxes of absent ballots and of 1% of the boxes of provisional ballots. Nearly all votes cast in the election were included in the pool from which these 1% samples were drawn. The Office's 1% counts came very close to the increased comprehensiveness and completeness that will be required in future elections by recent changes to the Election Code.

As directed by the Board of Supervisors, the ACROV also checked the approximately 4000 VVPATs for all touch screen machines used in the election, thus including early voting at the ROV Office and at other fixed and moveable locations throughout the county. The review of all VVPAT ballots—other than those included in the 1% sample—was carried out by scanning machine-readable bar codes. This was perhaps a double check on the voting records of the touch screen machines, but was not an actual hand recount of the approximately 4000 VVPAT print outs. The textual print-outs of candidate names are the only material on the VVPAT paper rolls that could have been read and checked by the voters themselves, so they are the only definitive indication of voter intent. Barcodes are not readable by the voters, so barcode scanners are not a satisfactory substitute for a hand count of the text printed on the VVPAT records. Registrar Macdonald has said that he does not plan to use the barcode method for future hand counts of 1% samples. The ACROV used a hand count, not a scanner, for the VVPATs that were part of the 1% sample of precincts.

Increased Public Notice and Observing

The ACROV improved its public notice and observing process compared with June 2006. It selected the precincts and boxes to be hand counted at a publicly announced and observed process. The date and time of the actual hand tally were announced long in advance on the ROV webpage. The date and time of the selection was announced about 24 hours in advance by telephone to members of the public who had requested notification. Public notice of the selection process and of the hand counting process itself have improved steadily in the elections following the November 2005 election. For future elections the Election Code will require 5 day advance notice of both the selection and the hand tally itself.

About a dozen people, members of the public and County staffers, were present at 4:30 pm, Friday, 17 Nov., 2006, to see a metal drum rotated and ping pong balls numbered 0 to 9 drawn in sequence to pick the 9 precincts, the 7 boxes of absent ballots and one box of provisional ballots selected for hand recounting.

During the November 2006 1% count and the Canvass as a whole, the rather restrictive practices of the ACROV Office observed in the November 2005 election were continued and made more restrictive. A Sheriffs Deputy was present throughout the count; an Associate County Counsel was present for the selection and the beginning of the counting. Observers were handed a sheet of strict "Election Observer Ground Rules," but not provided with explanations of the process they were observing.

Members of the public who wished to observe were able to see the staff carrying out the steps of 1% recount but without being able to actually follow, to hear or see in detail the substance of the activities. The ACROV complied with the letter of the election code provision which requires that the 1% count be public, but, we found, not with the spirit.

Recommendations for Handling the 1% Sample in Future Elections

Sampling 1% of Every Precinct and Every Vote: Efficiency and Security

We are confident that the ACROV office will maintain and continue to improve the efficiency and security with which it ensures that every vote is counted and that every vote has an equal chance of being sampled in the one percent sample. The details of the Registrar's response to our proposed practices in the Summary confirm our confidence that the 1% will improve in future. [Full response in Appendix B; summary and discussion in the introductory Summary and throughout this report.

Sorting Ballots by Precinct, A Daunting Challenge.

One of the new provisions of the Election Code will pose a particular challenge to the ACROV—the requirement that absent ballots from voters in precincts selected for the 1% sample be sampled and counted with the 'home' precinct. Currently, absent ballots are processed and scanned as they come into the ROV over several weeks, then boxed and sealed to preserve their security and get

them out of the limited work area. At the end of Election Day, the totals from these absent ballots are compiled electronically and distributed electronically to their 'home" precinct. They have not been physically sorted into their precincts, at least in recent elections.

The number of individual paper ballots in future elections will approach a million items. During the November election, there were more than 400,000 pairs of large, heavy paper ballots handled by the ACROV. The ACROV will have to sort ballots into 1219 piles or boxes representing individual precincts: process them; store those they come in before the election securely and retrievably; and then sort, process and store the ballots they are delivered on Election Day from polling places. These tasks present a formidable physical and technical challenge which may require expensive new sorting machines or services and new temporary or permanent work space.

Processing and Sorting Damaged Ballots. Since damaged ballots belonging to each precinct will also have to be included and these are generally the last to be processed, time pressure to complete the count and the sample within the required 28 days may be great.

Sampling Early Votes. In addition to this challenge, the Election Code will require a 1% sample of all early votes, currently all cast electronically on touch screen machines with VVPATs. If the number of votes cast on touch screens remains at current levels of about 4000, this should not be a problem, even though counting the VVPAT votes recorded on paper rolls is an awkward, slow process.

Need to Sample Provisional and Mail-In Precinct Ballots. In order to ensure that all votes have a chance of being drawn in a 1% sample, the ACROV will still have to sample provisional ballots and absentee ballots belonging to precincts that do not have polling places. Mail-In Precinct ballots could be sampled either by including all 1219 official precincts in the group of precincts to be sampled or by doing a separate sample of these ballots. The new Election Code provisions do not specify how provisional ballots should be sampled. If they are sorted into their precincts, this too could put a great time pressure on meeting the deadline to report the Statement of Vote, since provisional ballots are generally dealt with at the end of the Canvass.

Public Announcements; Public Observing and Public Understanding; Time and Space Limitations

Since we find that the ACROV Office carried out its primary task of counting and then sampling ballots accurately, completely, efficiently, we urge the ACROV to allow public observers to fully appreciate how well the Office does its work-- **by enabling them to see, hear and understand exactly what is going on.**

To accomplish this goal the ACROV will have to overcome the limitations of the available space. Registrar Macdonald is currently remodeling the back office and computer room areas to make them more efficient. Another approach would be to move the Canvass and the 1% manual tally to a larger and more adequate space—temporarily for large elections with large quantities of paper ballots or permanently. In any case, the ACROV will also have to overcome the pressures of the huge volume of ballots that will have to be process and sorted into precincts within the 28 day period after the election.

Easy Fixes. Small changes could dramatically improve the ability of the public observers to see, hear and understand the processes. Chalk boards or pads on easels could be used to post the totals arrived at by all the recount boards, the teams of three people which hand count the ballots. Totals could be recorded on a computer and transmitted to a large screen visible to all observers or even on the Internet. Copies of "Procedures for 1% Manual Tally" could be distributed to observers and/or a schematic description of the process could be posted on the walls of the room, as was done for some operations of the June 2006 Canvass. As discussed earlier, more extensive use of the ROV website and of print handouts could greatly improve public notice, information and understanding of the process and the election results.

As the Summary discusses in more detail, the Registrar has developed plans, consisting of some easy fixes, to record the reports of the recount boards so they can be read by observers and to expand the area where observers can walk and look so they can see the processes more fully.

Reconsidering Institutional Practices and Attitudes.

To make the changes to improve public observing that we propose, the ACROV Office and its staff will need to take a fresh look at their assumptions and their practices and figure out to what extent they can overcome the limitations of space and work flow to make changes in the way they deal with public observers. They will want to talk with ROV staff in counties which welcome observers in a more relaxed way. They will want to check that recount board members can feel comfortable and maintain their concentration and accuracy when being observed more closely.

We would like to suggest that the Alameda County Registrar of Voters Office's compliance with the letter and spirit of laws and regulations is its best protection against potential problems. We recommend that it can best serve the public's right to vote by permitting the public to observe its work fully and with understanding. We recommend that it continue to reach out to the public, invite questions and answer them fully, hold informational meetings, post useful information and responses to frequently asked questions on the ROV webpage, and invite interested citizens, including critics, to serve on advisory committees. These approaches are time-consuming; they do not always work. Nevertheless, we believe, they are often the best ways to identify and resolve issues before they become problems.

Appendix A

Sorting All Ballots into Precincts: Some Options and Discussion

Election Code 15360 as amended and filed with Secretary of State, Sept. 30, 2006 appears to require that, for the purpose of the 1% sample and hand tally of precincts, all ballots be physically sorted into the appropriate precincts, except possibly for early votes. At present, the ACROV does not sort absent voter, mail-in precinct or provisional ballots physically. Absent Voter and mail-in precinct ballot are boxed as AV ballots; Provisionals boxed as Provisionals. The two categories are sampled and hand counted separately, taking a 1% sample of boxes of each type. Thus, the ACROV is able to scan ballots as they come into the office and then box them in batches of about 600. Absent Voter and provisional ballots that arrive on Election Day and during the following night are similarly processed, scanned and sampled as part of the 1% sample of boxes of AV or Provisional ballots. The computer program that tallies all the votes automatically attributes each such vote to the appropriate precinct.

If the Secretary of State does indeed require that all ballots be physically sorted into the appropriate precincts for the purpose of taking the 1% sample, the ACROV and many other ROVs will face daunting challenges of work space, time, work flow and staffing to accomplish this task. We assume that the Election Code provision would require sorting into all precincts, including those currently treated as mail-in precincts, 1219 precincts at the last election.

In considering the options, it is essential to remember that we are talking about sorting **nearly a million** ballots, that is, more than 415,638 pairs of large awkward card stock ballots.

Their current procedure permits the ACROV to accomplish its work in a cramped work space. This space is currently being renovated. ROV staff are able to process absentee ballots before the election as they come in, scan them, then pack them up in boxes of 500 and seal them. On Election night and in subsequent days, the ROV sorts and processes into appropriate categories all the paper ballots that come into the polls. Ballots scanned at the polls can be packaged and put away—already in their appropriate precincts. But all others categories need different types of processing. These different types of processing are often carried out sequentially, so the easiest are completed first and the more complex or time consuming take longer, or are carried out by different staffers in a different part of the office and/or are handled after the easier tasks are out of the way. These ballots include AV ballots delivered on Election Day, to the ROV or polling places, provisional ballots and damaged ballots. The large size and volume of ballots makes handling them, sorting them and storing them in a secure way a real challenge. It is often a challenge just to complete all the existing necessary tasks in time to do the 1% sample and report the official results to the Secretary of State 28 days after the election.

Note: Absentee and Provisional ballots arrive in envelopes signed by the voter. ROV staff process Absentee Ballot envelopes through a machine that stamps an ID number on each envelope to keep track of them until they are opened, to count their number and so on. Ballot envelope signatures are then scanned optically and the signature compared with the signature stored electronically. Questionable signatures are compared by a staffer. Once the ROV determines that the voter has

not already had a ballot recorded and the signature is valid, the envelope is opened and separated from the ballot. The ballot is then scanned and packed up in a batch.

Below we list several proposals for sorting ballots currently being discussed in the community of Registrars and interested citizens, and we make some modest suggestions.

Methods for sorting before the 1% sample is drawn.

• **Enlist the Post Office to do the sorting directly or indirectly**. For example,
by assigning a different +4 extension to the ZIP code for each precinct.
The Post Office would then have to sort all mailed in ballots
into the 1000 plus precincts for the ROV. or
By renting 1000+ Post Office boxes, one for each precinct.
By making an agreement with the Post Office to use their sorting equipment to sort absentee ballots.
Registrar Macdonald reports that the Post Office says it is not able to assist in this task.

• **Buy a Pitney Bowes sorting machine.** Cost: $500,000. ACROV Dave Macdonald says he does not have money in the budget for this purchase. The Office might wish to explore leasing to spread cost over several years or sharing with one or more other counties, with, for example, one doing sorting early and another doing it later in the Canvass period. Dribs and drabs of ballots not sorted mechanically could be sorted by hand.

• **Sort by hand.** Problem: This is extremely labor and space intensive for large counties like Alameda County. Macdonald is considering this option, perhaps in combination with some preliminary mechanical sorting method.

Here is a suggested example of how mechanical and hand sorting could be combined to sort all ballots before the sample drawn. Finding the space and the staff to carry it out would be very demanding and probably increase costs significantly.

Preparation:
1. Print precinct numbers on absentee ballots and provisional ballots and or ballot envelopes before they are distributed. Possibly create some number of +four ZIP codes, say 100, so that the Post Office would do a preliminary sort. Or create 1219 ZIPs or ID numbers or barcodes to facilitate sorting in the ROV Office.
2. Set up 2-4 containers, cubicles or the like for each of the 1219 precincts; categories would be some of the following:
envelopes before signature check, envelopes after signature check, opened but unscanned ballots, scanned, packed and sealed ballots

3. Envelopes arrive at ROV Office and are processed and sorted.
4. Check signatures.
5. Hand sort by precincts to the extent needed to compensate for limitations of sorting in step 1 using markings on the envelopes [3 & 4 could be reversed]

6. When some reasonable number of unscanned ballot envelopes are in a precinct container, say 100 or more, open them and scan them. Put in an envelope or plastic bag and seal with security seal. Return to container for scanned ballots. This would limit the number of open piles and therefore the risk of confusion, breaches of voter privacy etc.
7. The pre-election portion of the processing and scanning would be closed out at a fixed time before the end of Election Day, as is done now.

After 8 pm election night and throughout the canvas:
8. Ballots cast at the poll but not able to be scanned at the poll would be scanned at the ROV, kept in their precinct order and stored with those scanned at the polls.
9. Late arriving AVs and AVs submitted on Election Day could be processed as a group and sorted into precinct piles at that time, using the system above; sealed and stored with other AVs.
10. Provisional ballots would be sorted into precincts using envelope IDs, signatures verified, opened, scanned and counted, packed and stored.
11. Damaged ballots would be corrected, sorted by precinct, scanned, or the reverse, and packaged by precinct.

Thus, when precincts were selected for 1%, the packages or boxes of absentee, provisional and other ballots for that precinct would be stored with and could be found quickly and counted at same time as packages or boxes of Election Day ballots and paper records of touch screens from that precinct.

Sorting ballots by precinct only after the 1% sample of precincts is selected.

Another possibility: Do not sort the ballots until after the precincts are selected. Once they are selected, run all the ballots through the central scanners again, programming the scanners to put ballots from the selected precincts into the secondary bin (usually reserved for write-in ballots). From there the ballots can be sorted by hand.

This method would take advantage of the fact that it is only necessary to sort the ballots in the handful of precincts selected to be part of the 1% sample; it is not necessary to sort 100% of the ballots in order to check the ballots in 1% of the precincts.
On the other hand, this method would require opening all sealed boxes or containers of ballots, rescanning them, repackaging, resealing and storing them, a large and probably time consuming task.

Editorial Note: The Committee thanks Registrar Dave Macdonald, ROV staff members Cynthia Corneijo and Xioneida Castillo, IT staff member Tim Dupuis and the many other Alameda County staff people who have responded to our queries and corrected our errors. Any remaining errors or omissions are our own.

Appendix B

Response of Registrar Macdonald to this Report, dated April 18, 2007, hand-delivered at meeting on April 23, 2007 and delivered by e-mail thereafter.