Please see my attached comments.
Thank you.

Eva Waskell

Comments from Eva Waskell
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Re: San Francisco Voting Systems Task Force Draft Recommendations dated January 2011

INTRODUCTION
I very much appreciate the work of the Voting Systems Task Force and I believe that the recommendations will have an overall positive impact on elections in San Francisco and the state of California.

SUMMARY OF COMMENTS
My comments are primarily focused on Section 2 entitled Election Records and Post-Election Audit Procedures. This is because many in the election community now see statistical auditing as the next big thing, the wave of the future, a state of the art process that will make the post-election canvass process better, i.e. more efficient, save money and reduce the work load of employees. What public official *wouldn't* be dazzled by these promises! I am sure that election officials have the best intentions in this regard. The vast majority of them are dedicated public servants who have always strived to do their best with limited resources and conflicting demands, i.e. we expect election results that are both accurate *and* fast.

I make the argument that the enthusiasm for statistical audits is extremely short-sighted, has hidden costs that have not been examined, and does not take into account the 47-year historical context that created today's dysfunctional election system and deeply flawed election technology. We must deal with much more than just the legacy of November 2000. If we fail to understand the past, we are doomed to repeat it.

Most importantly, a statistical spot check is a very weak solution to a very <u>huge</u> problem. I can't emphasize this enough. While spot checks may be universally used for commercial businesses, the public interest business of elections and the mission critical process of vote counting deserve much more. Verification of election results by an independently managed and controlled system is a stronger solution and it's the approach we need to be taking. This is the way not just to *improve* public trust, but to *regain* it on a large scale and *sustain* it throughout the future. This is exactly what happened in Humboldt County, which has been independently verifying the official results of all elections during the post-election canvass period since November 2008. The bottom line is that, in my opinion, it's more important that election results be accurate and have integrity than that the right person won.

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Another reason for my focus on statistical audits is that what happens in California elections matters; it has a ripple effect across the nation. Other states look to trend-setting California to be innovative and experiment with new approaches to election procedures and technology. So it is absolutely critical that the Task Force is in fact recommending that San Francisco be a testing ground for pilot projects. I strongly support this policy. And I would much prefer to see San Francisco conduct a pilot in 2011 of an independent verification method like the Trachtenberg Election Verification System (TEVS) rather than a pilot of a risk-limiting audit. Five counties have already signed up for these statistical audits.

Additional comments include the following topics:

1- Background information regarding a) AB 2023, which calls for improvements in accuracy and voter confidence, and reports on monetary costs and efficiencies, and b) highlights of the 47-year historical context that created the intractable problems we're now trying to solve, including warning signs that were ignored for decades.

2- A comparison of risk-limiting audits and the Trachtenberg Election Verification System (TEVS) in terms of costs and benefits, including the impact on transparency, citizen engagement, and voter confidence; and a look at some of the concerns raised by these two very different approaches. A few of the drawbacks of risk-limiting audits are that they are fundamentally asking the *wrong* question(s), they focus on races/contests that are close, and they make a pretty shaky assumption when dealing with races/contest that are separate by a very wide margin.

3- The need for evidence-based legislation.

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NOTE: Because the use of the words *verify* and *confirm* are used interchangeably, and incorrectly in my view, throughout the presentation and papers that discuss risk-limiting audits, let's begin by being very clear about the definition of the verb *verify*.

verify – from the Latin *verus* meaning true
According to dictionary.com:
1. to prove the truth of, as by evidence or testimony; confirm; substantiate
2. to ascertain the truth or correctness of, as by examination, research, or
comparison
3. to act as ultimate proof or evidence of; serve to confirm.

According to merriam-webster.com:
1. to establish the truth, accuracy, or reality of

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A CLOSE LOOK AT AB 2023 AND HISTORICAL CONTEXT
I'd like to consider two aspects of AB 2023: the improvements it calls for and the costs involved. First, let's briefly discuss the improvements.

The Task Force draft states on page 12 that AB 2023 authorizes "5 or more voluntarily participating counties" to conduct pilots of risk-limiting audits in 2011. A report will then be given

to the California Legislature evaluating the effectiveness and efficiency of the audits. The actual language that would be added to the California Elections Code states that the risk-limiting pilot program is "to **improve** [emphasis mine] the accuracy of, and public confidence in, election results."

As far as I can tell, the 5 pilots of risk-limiting audits will undoubtedly show that these improvements are possible.

But in my opinion, we need much more than improvements based solely on a statistical methodology that only a PhD in statistics can understand. The paper "Implementing Risk-Limiting Post-Election Audits in California" states on the bottom of page 19 that "Efficient risk-limiting audits are complicated and difficult for the public to understand." Part of the conclusion states that "the methods [of risk-limiting audits] are complex. One look at the math involved in the variety of papers that discuss these audits is enough to convince any ordinary voter that the process underlying these audits is totally opaque. But isn't public acceptance of election results the ultimate goal? Can we really attain this goal in light of the following observation?

> David Dill, speaking on a panel in San Jose on February 17, 2011 at a special meeting of the Santa Clara Citizens Advisory Commission on Elections, responded to a question about risk-limiting audits and said that you could understand them "if you took a course in probability."

Why is public acceptance and trust in election results so critical? Because that trust has been broken, especially since the events of November 2000. For me personally, that trust was first broken in 1985. And consider the fact that _every_ report from independent scientists since 2000, including Secretary of State Bowen's 2007 Top To Bottom Review (TTBR), has documented serious and fundamental flaws in the design of our voting technology, vulnerability to insider misuse, problems with reliability, pre-election testing done in test mode while the election is done in election mode—critical flaws that call into question the very core competency of the people who designed these systems.

But wait. Many of these flaws that were "newly" discovered after 2000 were known and documented back in the 1980s. Computer experts had examined vote-counting source code as part of litigation and found that votes could be changed without leaving trace, the audit trail could be turned off from the operator's console, and a popular model of voting machines had switches right on the front panel that allowed anyone direct access to memory, and hence the ability to change the computer's instructions while the election was in progress. I talked to these experts myself and read their reports. Dr. Willis Ware from the Rand Corporation in Santa Monica was another early and articulate critic. And then there were the two computer experts from Princeton and Wharton hired by The New York Times in 1985 to review the source code from Berkeley-based Computer Election Systems, an ancestor to the vendor with today's largest market share, Election Systems & Software (ES&S). Guess what? These scientists also found vulnerabilities to manipulation and numerous flaws in the software.

And what was the reaction from the election community to this steady barrage of documented product defects in the voting systems purchased with taxpayer dollars? Denial that any problems with voting equipment really existed. Computer security experts and other scientists were dismissed because they didn't understand elections; they had never run one so how could they _possibly_ know about all of the security measures and rigorous testing and all of the checks and balances that were in place? Same thing goes for those crazy citizens who wore tin foil hats and sounded like Chicken Little. The message to me was unmistakably: Trust us. We know best.

In addition to the flawed technology that was officially tested and certified for use, there is a long history of lack of transparency, limited observer access, and little to no meaningful oversight. These problems are still with us but I won't delve into the details.

Why am I telling you all of this? Because unless we understand the historical context of today's unsolved problems and the systematically shortsighted, policy-making that lead inevitably to November 2000, we are doomed to repeat many of the mistakes of the past. From my vantage point of having closely watched a public policy disaster slowly unfold since 1985, I see risk-limiting audits taking us in the wrong direction. We must trust, but verify...independently.

I say this for the following reasons. Given this *extremely* brief historical overview, which clearly indicates that _repeated_ warnings were ignored; and given the vast and complex and somewhat arcane nature of the *systemic* problems in elections we now face; and given the fact that it was a top-down approach dominated by a mindset that required voters to trust the election officials, trust the vendors, trust the experts designated by elections officials and vendors—an approach that created this deeply ingrained dysfunctionality in the first place; and given the fact that the public conversation about election reform has ignored and/or marginalized voters (with rare exceptions), I humbly submit that we need to take a hard and honest look at the long-term benefits and risks of supporting either risk-limiting audits or TEVS. The choice is the simple and the stakes couldn't be higher. We must put the public into our public elections or we will never regain public trust.

For at this particular point in time, we need more than ever to raise the bar for establishing confidence in elections by verifying election results using an independently managed and controlled system. Roy Saltman recommended exactly that on page 91 of his classic 1975 report "The Effective Use of Computing Technology in Vote-Tallying." The use of independent information for verification purposes is standard practice for many mission critical processes, but *not* in the mission critical process of vote counting. For example, the aviation industry uses readings from independent or redundant devices to guide pilots in flight.

Independent verification is not the same thing as providing strong statistical evidence. It just isn't. A risk-limiting audit does *not* verify, and it does not independently verify election results. Voters have had to live with the miserable 1-percent manual tally since 1965. They've been told ad infinitum and over *decades* that it would be too expensive to audit or recount more precincts. I personally have been told again and again by election officials across the country that the 1-percent requirement (or perhaps it's a requirement of 3-percent of the precincts) is enough to verify the accuracy of election results, which is an absurd statement. The headline of an article by William Trombley in the July 3, 1989 Los Angeles Times reads "State Counts on 1% Sample to Detect Fraud." Another absurd and troubling statement.

So now we're being asked to replace the wimpy 1-percent manual tally with...what? A process that voters don't understand. A process that is basically too little and way too late. Voters deserve much better than "a statistically meaningful measure of confidence that electoral results are accurate."

THE RISKS OF USING RISK-LIMITING AUDITS
One of the dangers I see is that this relatively small improvement in post-election auditing, an improvement based on a statistical methodology that no policy-maker in Sacramento understands, that no average voter understands, and that no registrar of voter understands, will create a false sense of trust. This would be a great tradgey.

Another problem has to do with races/contests where there is a wide margin of victory. So if Candidate A receives 5 votes and Candidate B receives 500 votes, this statistical approach would indicate that very few ballots would have to be hand-counted to provide a certain level of confidence that Candidate B is the correct winner. What? The shaky assumption here is that races in the election with a wide margin of victory are "correct." That's *not* a valid assumption to make, especially when you consider the insecure nature of the proprietary voting systems used to produce official election results.

A risk-limiting audit would *not* have caught the zero deck problem in Humboldt County because this programming error, i.e. product defect, showed up in only one precinct. This is why it's essential to independently recount <u>all</u> of the ballots if you want trustworthy election results.

And speaking of all of the ballots, what would be the cost of coming up with a 99% or 100% statistical confidence level in election results? Once we know what this cost is, we would be able to do a valid monetary cost comparison between risk-limiting audits and TEVS. Any other monetary cost comparison will really be unfair.

These are just a few of the questions that are answered by risk-limiting audits: What do you do when there's a discrepancy in the manual 1% tally? What rules should you use to "escalate" the audit? "What is the biggest chance that—if the outcome is wrong—the audit would have found "as little" error as it did?" These are certainly *good* questions if your goal is to improve the 1% manual tally. But the fundamental questions that untimately <u>must</u> be asked are: Are the election results accurate and do they have integrity? Are they trustworthy? How do I know that?

Finally, slide 20 of Philip Stark's presentation at the EVT/WOTE conference on August 10, 2010 in Washington, DC <http://www.stat.berkeley.edu/~stark/Seminars/evtwote10.pdf> said that

> "Auditing using an unofficial vote tabulation system that does produce CVRs [Cast Vote Records]—such as those of Clear Ballot Group, the Humboldt Transparency Project, or TrueBallot—and confirming transitively that the apparent outcome is correct, might be the best interim option. (See Calendrino et al, 2007)"

While TEVS is acknowledged above as an interim solution, I would argue that TEVS should be a permanent solution.

THE COST ISSUE
AB 2023 states that the report to the Legislature shall also include "the costs of performing the audits, as compared to the 1-percent manual tallies conducted in the same election pursuant to Section 15360." The paper by Hall et al referenced in footnote 8 on the bottom of page 11 reports that the risk-limiting audits of four contests in a 2008 election were modest. I have no doubt whatsoever that the 2011 pilots will also report modest costs and improvements in efficiency.

All of the press releases, news articles, presentations and papers I've read regarding risk-limiting audits stress the cost savings and the fact that this method means much less work for the registrar of voters. Well, who *wouldn't* want this? Especially in these stressful economic times. But wait a minute. There's a well-known saying that there are three features to consider in any purchase: good, cheap and fast. The catch is that you can only have two of the three. Historically, the guiding principle in the purchase of election-related equipment has been to choose cheap and fast. Good goes out the door for a variety of reasons, which every past and present election official can readily explain. And it's important to realize that *these reasons are, and have been from the very beginning, inherent in the structure of our election system*. Like

the fact that election officials at both the state and local levels have continually been starved of the resources needed to carry out their duties.

I'd like to say only a few things about the cost issue. First, we get what we paid for, and sometimes not even that. Second, *we need to look carefully at other costs in addition to the monetary costs.* What is the impact on transparency? A negative one, as explained above.

What is the impact on citizen engagement and public trust in the election process? The risk-limiting audits have a limited roll for citizens. There's a kind of private collaboration between academics and registrars of voters, with perhaps a few good government groups thrown in. But the grassroots are pretty much shut out.
Yes, voters can inspect ballots and/or ballot images for whatever ballots are given to them by an expert in statistics. And they can compare the hand count with the machine count.

If TEVS is being used, the voters get to inspect _all_ of the voted ballots. They get a DVD of the ballot images and *they can count the votes for themselves* in any race or contest in the election. The critical element here is that the implementation of TEVS creates a collaboration between the registrar of voters and citizens who are scanning the ballots, checking to see that scanned images match the original ballots, and comparing the redundant independent count with the official count. Citizens get behind the scenes of an election in a productive manner; the curtain is lifted and the ever-present imperfections are there for all to see and to make corrections. This is how you create public trust: active and ongoing engagement; honestly admitting any mistakes made; and most importantly, working together in mutual support to make improvements. This is how public trust was created in Humboldt County. It also made the registrar of voters the most popular public official in the county.

STATISTICAL AUDITING IS NOT INDEPENDENT VERIFICATION
It's important to note that although the actual language of AB 2023 says that the purpose of the bill is to "improve" accuracy and voter confidence, the Legislative Counsel's digest of AB 2023 says these pilots are "for the purpose of **verifying** [emphasis mine] the accuracy of election results." Improving and verifying are *not* the same thing. I also noticed that in several of the papers and presentations dealing with risk-limiting audits, the authors frequently use the phrase "confirm an election outcome." The dictionary says that "confirm" is a synonym for "verify." However, risk-limiting audits do not verify; they only provide statistical evidence.

THE NEED FOR EVIDENCE-BASED LEGISLATION
I also strongly support data-driven public policy. It is widely recognized by academics and citizens that policies and procedures in election administration have _not_ been data-driven historically and that much work and basic research still needs to be done in this area. I am also a firm believer in evidence-based legislation, especially when it comes to elections. So let's take a look at what the policy makers in Sacramento are doing with respect to election integrity.

AB 2023 calls for 5 pilots and 5 reports. And based on these 5 data points, the Legislature is very likely going to go ahead and mandate risk-limiting audits. I submit that it would be much better for the public interest if the Legislature first gathered more data and more evidence, especially considering what's at stake. I'd like to see a bill that authorizes 5 pilots of TEVS. Then I'd like to see a comprehensive comparison between risk-limiting audits and TEVS that includes the factors mentioned previously and not just the financial costs.

THE ROLE OF ACADEMICS
Academics, specific subject matter experts, and election science certainly have a role to play in improving election administration. Here are just a few examples: the top notch team of scientists

who did California's 2007 Top To Bottom Review; David Wagner's June 2010 Audit Log Study; reports on accessibility issues by Noel Runyan; the Design for Democracy project by experts in graphic design; the Brennan Center's 2008 report on Ballot Design; the Caltech/MIT Voting Technology Project; Roger G. Johnston's analysis of protocols for seals used on voting machines in New Jersey; Ted Allen, the associate professor of industrial and systems engineering at Ohio State University who worked with a consultant to devise a proper formula for machine distribution in Franklin County. Closer to home, the Marin County Registrar of Voters hired a plain English expert to review election materials and make recommendations. Kudos to everyone involved!

But when it comes to the vote counting in *public* elections, the counting should not be concealed. The public should not have to rely solely on experts. As Mitch Trachtenberg says, "Voters are entitled to understand for themselves how the results were obtained." For decades, voters have had to trust the vendors and trust election officials, who all too often blindly trust each other. The public trust in the election process has been broken. So it's no wonder that election integrity advocates are asking, like math teachers do in school where students are required to show their work, that election officials show how they came up with the results. The burden of proof is on election officials, and that burden of proof is diluted when statistical methods are employed to certify that election results are true and correct.

> NOTE: In March 2009, the German Federal Constitutional Court ruled that electronic voting was unconstitutional. As part of the ruling, the Court essentially made the same argument that Trachtenberg made in the above paragraph—voters should not have to rely on experts.

CONCERNS ABOUT TEVS
On more that one occasion and with my own ears, I have heard misunderstandings and misrepresentations regarding TEVS. What follows is an attempt to clarity some of the most frequently heard concerns.

Let me first note that no election is ever perfect, nor should anyone expect it to be. I have *never ever* heard a critic of elections, including both academics and citizens, say that she or he expects any election to be perfect. But elections must be honest! Public elections must also demonstrate transparency, accountability, oversight, observer access, enforcement of election laws. Thus, it is fair to say that TEVS is not perfect. It's a work in progress, work that has been recognized by NIST (National Institute of Standards and Technology) in the form of a grant to Mitch Trachtenberg. The Marin County-based Grace Institute for Democracy and Election Integrity has recently awarded a development grant to Trachtenberg to make needed improvements on the software. The Humboldt County Registrar of Voters has applied for an EAC (Election Assistance Commission) grant to create a user manual and website to assist any county that wants to implement TEVS. Stay tuned for more progress reports.

Meanwhile, here are some of the concerns that have been raised about TEVS and a brief response.

Concern: Open source software is not bug free.

Response: Of course, open source software is not bug free. *No software is bug free.* The vote-counting software from the vendors is certainly not bug free, as Bowen's TTBR and Ohio Secretary of State Brunner's 2007 EVEREST (Evaluation and Validation of Election Related Equipment, Standards and Testing) report clearly demonstrated. But let's have a proper sense of proportion when we discuss this issue. For example, the software used in TEVS is nowhere

near as complex as that used by the vendors, it can be inspected (I'm familiar with Ken Thompson's famous paper. I've worked as an assembly language programmer so *I know what I don't know.),* and TEVS is written in modules to make source code review and testing easier. All I'm saying is that the risks associated with using the open source-based-TEVS are less that the risks associated with using 500,000 lines or more of proprietary code from privately owned companies.

Concern: The scanner used to scan ballots and create ballot images has to be calibrated correctly so the ballot images are true representations of the original ballots.

Response: The scanners used in TEVS are commercial off-the-shelf scanners. It would be much harder for a randomly selected off-the-shelf scanner to produce false ballot images than it would be for a proprietary vote-counting system to create a false count.

Concern: "Publishing ballot images, as the Humboldt County Elections Transparency Project did, also holds promise for ensuring the accuracy of elections. But his too poses problems that have not yet been addressed. For example, there needs to be a provision for auditing the completeness and accuracy of ballots images. And there needs to be a way to ensure that ballots cannot be associated with individual voters, to prevent vote selling or coercion."
- "Implementing Risk-Limiting Post-Election Audits in California" by Joseph Lorenzo Hall et al, page 22

Response: These two problems are in fact being addressed albeit in a limited manner. Just as the authors of the paper cited above propose several additional steps that have to be taken to refine the risk-limiting methodology, the author of TEVS is well aware of these two problems and is taking steps to solve them. For example, a certain number of the ballot images are visually compared to the physical ballots. And the ballots images can be put onto a DVD and not published on the Internet in an attempt to protect voter privacy. Of course, these are not full-proof solutions. But great improvements can be made to address these problems if we put our minds to it—and the resources.

Concern: Loss of voter privacy might lead to vote buying/selling and voter coercion.

Response: These problems, among others, already exist with Vote By Mail and they are *huge*. But in spite of the well-known risks, election officials and politicians support an expansion of Vote By Mail. The driving forces and main topics of concern are monetary cost savings, voter convenience and increased voter turnout. In the public conversation about Vote By Mail, the risks involved are minimized or simply ignored.

There are already laws in place with penalties for vote selling. These laws *are* enforced. People have gone to jail. Anecdotal evidence based on news reports appears to indicate that the problem of vote selling is rare, although it has happened. I have not seen any quantitative analysis or election research done by political scientists or other academics that provides data to counter this assessment.

The unsubstantiated claim that publishing ballots will lead to vote selling is just that. An unproven claim. A theory. The implication, in my view, is that this theoretical vote selling will be massive and pose such a high risk that we should never publish ballots. These critics seem to be using fear and the potential for vote selling as an imaginary bogeyman to prevent the publication of ballots. Why is it that vote selling has suddenly become a topic of major concern, especially among academics, in the public conversation about how to increase public trust in

election results, but has been missing in action in the public conversation about Vote By Mail? I don't understand.

In sum, the voter privacy risks related to Vote By Mail are _huge and pervasive_, while the same risks related to TEVS are relatively small in comparison.

Concern: Chain of custody

Response: Evaluating the chain of custody used in an election jurisdiction and establishing best practices for the physical custody of ballots (and the necessary duplication of ballots) are absolutely essential. Garbage in, garbage out. If you're not dealing with all of the official and valid ballots, what's the point? At the present time, no election official is required to swear under oath that the ballots involved in _any_ post-election process are all of the official ballots and have not been tampered with in any way. So the integrity of the chain of custody process is critical to the integrity of a recount, any type of post-election audit, and an independent verification method like TEVS. The point is that chain of custody issues are _not_ unique to TEVS. The system in place for the official post-election canvass process and official election results is the same system underlying the independent, redundant vote count done by TEVS. So the risks emanating from an unexamined or broken chain of custody, and both risks typically do exist in most jurisdictions, are the same for both the official election results and for TEVS.

Concern: Cost

Response: The cost of the off-the-shelf scanner used in Humboldt County in 2008 was about $25,000. That same scanner is now $5,000. The price will continue to decrease. The labor costs depend on whether or not volunteers are used. But the overall cost of implementing TEVS is inexpensive compared to the benefits that accrue.(How do you put a price tag on the public trust and citizen engagement that is inherent in using this independent verification?)

Concern: Scalability

Response: Humboldt County had 134 precincts and 51,792 voters out of 78,387 registered voters in the November 2010 general election. For larger counties like San Francisco, which had 590 precincts and 284,625 ballots cast in the same election, TEVS would be introduced incrementally. A good place to start would be to scan all of the ballots that are used in the 1% manual tally.

COMMENTS ON SPECIFIC PORTIONS OF THE DRAFT
The following comments will likely make sense only after reading the comments on the previous pages.

Page 7, line 8 should read "...deals only with post-election ~~verification~~ auditing of the results.

Page 7, line 31 is now blank Add an explanation of the concept "verification of election results"

Page 10, line 34 reads "Alternative auditing procedures" and is followed by a brief description of the Humboldt County Election Transparency Project. Strictly speaking, the Humboldt project is not an alternative auditing procedure. It is an independent verification. There's a big difference.