DEBRA BOWEN
CALIFORNIA SECRETARY OF STATE
NEWS RELEASE

Frequently Asked Questions
About Secretary of State Debra Bowen's
Top-To-Bottom Review of California's Voting Systems

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To view prior versions of this FAQ, please click here.

The Secretary of State released her decertification and recertification orders on August 3, 2007. What do those orders mean?
The Secretary of State decertified the following voting systems on August 3, 2007:

- Diebold GEMS 1.18.24/AccuVote TSX/AccuVote-OS
- ES&S InkaVote Plus Precinct Ballot Counter Voting System, version 2.1
- Hart Intercivic System 6.2.1
- Sequoia WinEDS version 3.1.012/Edge/Insight/400-C

She then recertified all but one system (the ES&S InkaVote Plus Precinct Ballot Counter Voting System, version 2.1) with a number of conditions. A detailed list of all of the conditions for each system can be found by **clicking here**, but in brief, the conditions require:

- Counties that use any one of the six systems must adopt security procedures detailed in the recertification documents.
- For counties using direct recording electronic (DRE) machines made by Sequoia and Diebold, no more than one such machine may be used per polling location on Election Day. Elections officials must conduct a 100% manual count of the voter-verified paper audit trail (VVPAT) for votes cast on those machines.
- All six systems will be subject to increased post-election audits to ensure election results are accurately tabulated.

How will counties and voters be affected by this decision?
Nearly nine million California voters cast ballots in the November 2006 gubernatorial election and over 75% of them voting using either a paper-based absentee ballot or a paper-based optical scan ballot.

Of California's 58 counties, 35 of them rely primarily on a paper-based optical scan system for their Election Day balloting. Most of them use one DRE in each polling place to comply with the Help America Vote Act (HAVA) requirement to enable voters with disabilities to vote privately and independently. These counties will have to comply with a number of security and post-election audit requirements, but by and large, voters in these counties won't see any change when they go to the polls on Election Day.

Two counties rely on the Hart Intercivic DRE for their polling place voting system. These counties will have to comply with a number of security and post-election audit requirements, but by and large, voters in these counties won't see any change when they go to the polls on Election

Day.

Twenty-one counties rely on either the Sequoia Edge I, the Sequoia Edge II, or the Diebold TSx DRE systems for their polling place system. Except for the single DRE allowed per polling place, these counties will have to adopt a new Election Day voting system. It is in these 21 counties where voters will notice the biggest change on Election Day.

For a list of voting systems by county, please **click here**.

Why wasn't the InkaVote Plus voting system recertified?
ES&S, the provider of the InkaVote Plus system, didn't provide the equipment and information necessary for that system to be included in the review in a timely fashion. The Secretary of State intends to put this system through the same rigorous testing process the other systems in the top-to-bottom review process were subjected to. Depending on the results of the review, that system may be recertified in time for it to be used in the February 2008 presidential primary election.

How much did the review cost and where did the funding come from to pay for it?
Approximately $450 million has been spent or set aside to upgrade California's voting equipment over the past several years.

The total cost of the top-to-bottom review was originally estimated to be $1.8 million, but because fewer systems were reviewed than was anticipated, the cost to date has been $905,000.

A portion of the money used to conduct the review came from the $760,000 in federal HAVA funding that was provided by the Legislature for voting machine source code review as part of the 2006-07 state budget. The remaining funding for the review came from the voting system vendors. It's estimated the review of each system cost approximately $262,000, with the costs being split equally between the vendor and California's HAVA funding allocation. California law, as well as the certification agreements many of the voting system vendors signed with the former Secretary of State, allow the Secretary of State to review voting systems at any time and allow the Secretary of State to require vendors to pay for the cost of conducting the review.

Why was it necessary to conduct a top-to-bottom review of California's voting systems?
The top-to-bottom review was designed to give California's voters an answer to one simple question: Are all of California's voting systems secure, accurate, reliable and accessible?

Furthermore, Elections Code Section 19222 requires the Secretary of State to review the voting systems Californians are asked to cast their ballots on, stating:

> The Secretary of State shall review voting systems periodically to determine if they are defective, obsolete, or otherwise unacceptable. The Secretary of State has the right to withdraw his or her approval previously granted under this chapter of any voting system or part of a voting system should it be defective or prove unacceptable after such review. Six months' notice shall be given before withdrawing approval unless the Secretary of State for good cause shown makes a determination that a shorter notice period is necessary. Any withdrawal by the Secretary of State of his or her previous approval of a voting system or part of a voting system shall not be effective as to any election conducted within six months of that withdrawal.

What is a top-to-bottom review of California's voting systems?
The top-to-bottom review consisted of a thorough examination of all voting system documentation, procedures and the equipment used to record and tally votes. The review had four components:

- A document review examined manufacturer documentation, testing reports from federal Independent Testing Authorities (ITAs), reports from prior state certification testing, and reports of independent examinations and testing of voting systems.

- A source code review examined the human-readable instructions that are converted into machine-readable code to run the voting systems. The primary focus was to identify any security vulnerabilities that could be exploited to alter vote recording, vote results, critical election data such as audit logs, or to conduct a "denial of service" attack that prevents people from voting.

- Red team penetration testing involved open-ended, hands-on efforts to identify and document any potential for tampering or error in any part of the voting system's hardware, storage devices or software.

- The accessibility of the voting systems was assessed and included test voting on each of the voting systems by volunteer voters representing a broad range of disabilities.

The document review teams, source code review teams and red teams interacted regularly to learn from one another and to ensure the review of all systems is even-handed.

How were the voting systems evaluated and did that differ from the draft criteria published on March 22?
The draft criteria was an initial proposal for discussion and public input. Based on the substantial number of comments received, the final project plan used to evaluate the voting systems didn't include those draft standards. Instead, the top-to-bottom review teams provided an independent technical evaluation of the voting systems that the Secretary of State used to carry out her statutory duty with respect to voting systems, as required by Division 19 of the State Elections Code.

The standards and definitions for security, accuracy, reliability and protection of ballot secrecy governing the top-to-bottom review are set forth in the federal 2002 Voluntary Voting System Standards, which may be found at http://www.eac.gov/election_resources/vss.html. California Elections Code Section 19250 requires voting systems to comply with these standards as a condition of being certified for use in the state.

With respect to accessibility for voters with disabilities and with alternative language requirements, the standards and definitions governing the top-to-bottom review are set forth in the 2005 federal Voluntary Voting System Guidelines, which may be found at http://www.eac.gov/VVSG%20Volume_I.pdf and in California Elections Code Sections 19227, 19250 and 19251.

The red team penetration testing was conducted in accordance with Resolution # 17-05 of the Technical Guidelines Development Committee (hereafter "TGDC") of the U.S. Election Assistance Commission, adopted at the TGDC plenary meeting on January 18-19, 2005, which calls for:

> ". . . testing of voting systems that includes a significant amount of open-ended research for vulnerabilities by an analysis team supplied with complete source code and system documentation and operational voting system hardware. The vulnerabilities sought should not exclude those involving collusion between multiple parties (including vendor insiders) and should not exclude those involving adversaries with significant financial and technical resources."

Who conducted the review?
The Secretary of State contracted with the University of California (UC) to assemble three top-to-bottom review teams that relied on specialists from UC, as well as from public and private universities and private sector companies throughout the United States. To ensure a fresh look at the voting systems, scientists with specific experience in voting system technology and security experts from other fields who had no experience with voting system technology were asked to participate. Each review team consisted of at least seven members and included three components – document review, source code review, and red team penetration testing.

- The two Principal Investigators for the project were Matthew Bishop, Professor in the Department of Computer Science and Co-Director of the Computer Security Laboratory at UC Davis, and David Wagner, Associate Professor in the Computer Science Division at UC Berkeley, with extensive experience in computer security, cryptography and electronic voting. David Wagner is a founding member of the ACCURATE center, which is funded by the National Science Foundation to research ways that technology can be used to improve voting.

The accessibility of the voting systems was assessed by a single team of two accessibility experts, headed by Noel Runyan, an electrical engineer and computer scientist with over 33 years experience in designing and manufacturing access technology systems for people with disabilities. The accessibility assessment included test voting on each of the voting systems by volunteer voters representing a broad range of disabilities.

For a complete listing of team members, as well as resumes, biographies, and/or curriculum vitaes, please **click here**.

What if a voting system vendor chose not to participate in the review?
If a vendor chose not to have its voting system reviewed, the Secretary of State had the option of initiating a decertification process immediately. The Secretary of State could also impose conditions on the use of such systems, even though they had not been through the top-to-bottom review, in the event a vendor would like to have a county use such a system in 2008.

What happens with new voting systems that receive federal approval?
If a system received federal approval and was submitted to the Secretary of State by July 1, 2007, for certification in California, the Secretary of State will fully review that system using the same standards that were applied in the top-to-bottom review.

What if a vendor opted out of having its existing system tested in anticipation of federal approval later this year for a replacement system?
Any system that was not federally certified and submitted to the Secretary of State by July 1, 2007, will not have sufficient time to complete the state certification process before the February 2008 election. Therefore, if a vendor opted out of the top-to-bottom review but did *not* submit a replacement system for certification by July 1, 2007, the Secretary of State may either decertify or conditionally recertify the existing system for 2008 elections with additional restrictions.

Did the top-to-bottom review test entire voting systems or only the voting machines used in polling places?
The only way to make sure a voting system is properly recording and counting votes is to review a voting system from top to bottom. That's why the review included all of the various machines used to *cast* ballots, as well as the systems used to *count* ballots, including vote tabulating devices, election management and tabulation programs, and associated firmware, software and peripheral devices.

What systems were tested?
The following certified voting systems were examined and tested under the top-to-bottom review:

Diebold GEMS 1.18.24/AccuVote

- GEMS software, version 1.18.24
- AccuVote-TSX with AccuView Printer Module and Ballot Station firmware version 4.6.4
- AccuVote-OS (Model D) with firmware version 1.96.6
- AccuVote-OS Central Count with firmware version 2.0.12
- AccuFeed
- Vote Card Encoder, version 1.3.2
- Key Card Tool software, version 4.6.1
- VC Programmer software, version 4.6.1

Hart Intercivic System 6.2.1

- Ballot Now software, version 3.3.11
- BOSS software, version 4.3.13
- Rally software, version 2.3.7
- Tally software, version 4.3.10
- SERVO, version 4.2.10
- JBC, version 4.3.1
- eSlate/DAU, version 4.2.13
- eScan, version 1.3.14
- VBO, version 1.8.3
- eCM Manager, version 1.1.7

Sequoia WinEDS version 3.1.012/Edge/Insight/400-C

- WinEDS, version 3.1.012
- AVC Edge Model I, firmware version 5.0.24
- AVC Edge Model II, firmware version 5.0.24

- VeriVote Printer
- Optech 400-C/WinETP firmware version 1.12.4
- Optech Insight, APX K2.10, HPX K1.42
- Optech Insight Plus, APX K2.10, HPX K1.42
- Card Activator, version 5.0.21
- HAAT Model 50, version 1.0.69L
- Memory Pack Reader (MPR), firmware version 2.15

Were any systems not reviewed by the Secretary of State s part of the top-to-bottom review?

The DFM Mark-A-Vote system used by Lake, Madera, and Sonoma counties was not reviewed in this round of testing, but the Secretary of State reserves the right to conduct a review of this system at a later date.

The Opto-Mark system, operated by Martin & Chapman Company and used in several cities to conduct local elections, was not reviewed in this round of testing, but the Secretary of State reserves the right to conduct a review of this system at a later date.

The Votec system, used by the City of Los Angeles to conduct local elections, was not reviewed in this round of testing, but the Secretary of State reserves the right to conduct a review of this system at a later date.

ES&S declined to submit its Unity 2.4.3.1/AutoMARK and its City and County of San Francisco Voting System to the top-to-bottom review because it doesn't intend to have any county use those systems in 2008. Should ES&S attempt to have a county use those systems, the Secretary of State has the right to attach additional use conditions to the systems pursuant to the 2006 certification of the systems, regardless of the fact that they weren't submitted for inclusion in the top to bottom review.

As noted earlier in this document, ES&S didn't submit its InkaVote Plus Precinct Ballot Counter Voting System, version 2.1, in time for it to be included in the review, despite the fact that the sole California user of this system – Los Angeles County – intends to use the system in 2008. As a result, the Secretary of State has decertified the system, but intends to conduct a review of this system soon and has the right to recertify it depending on the results of that review.

Hart Intercivic declined to submit its System 6.1 to the top-to-bottom review because it doesn't intend to have any county use that system in 2008. Instead, Hart Intercivic has voluntarily opted to decertify that system, meaning the Intercivic System 6.1 won't be used by any city or county in 2008.

Los Angeles County declined to submit its Microcomputer Tally System (MTS) version 1.3.1 to the top-to-bottom review because it intends to move to an alternate system in 2008. Should it decide to use the system in 2008, the Secretary of State has the right to attach additional use conditions to the system, regardless of the fact that it wasn't submitted for inclusion in the top-to-bottom review. A link to a letter detailing Los Angeles County's decision not to submit its system to the top-to-bottom review can be found **here**.

Where was the top-to-bottom review being conducted?
Testing, examination and review activities, and analysis were conducted onsite at the Secretary of State's facilities in Sacramento under secure conditions, with one exception. The review of documentation and source code was, upon express written authorization of the Secretary of State, conducted at secure facilities of UC or other secure locations designated by UC.

Was this review open to the public?
Given the proprietary nature of the systems being reviewed and the legal requirements to protect the intellectual property of the vendors, the ability to conduct the review in a completely public fashion was severely constrained. However, the Secretary of State created a public observation room that allowed any member of the public to watch the review process via the security cameras that were set up in the testing facility. The Secretary of State maintained an updated telephone hotline to allow anyone to call in and find out what the testing schedule was for the following day, so they could determine if they wanted to come to the public observation room to view it.

How can I read the reports prepared by the independent UC review teams?
You can **click here** to get back to the main Top-To-Bottom Review Page, where you'll find copies of the UC top-to-bottom review reports and more information about the entire top-to-bottom review process.