

# EIGHT ESSENTIALS OF A STRONG VOTING SYSTEM REFORM BILL

By Iowans for Voting Integrity

## **1. A statewide conversion to precinct-count optical scan voting systems, with random post-election hand audits of the paper ballots, and ballot-marking devices used for accessibility for disabled voters. The conversion to optical scan systems should be funded by the state.**

There is a hardening national consensus that computer systems used to count votes should have an independent paper record of each vote cast. In order for paper records of votes to serve as an effective check on error or fraud in the computer tabulation, however, the paper records must be manually checked against the computer count. In June 2006, the Task Force on Voting System Security of New York University Law School's Brennan Center for Justice released a report, titled "The Machinery of Democracy," on the vulnerabilities of current voting systems and the best methods of securing elections.

The Brennan Center task force's members included Dr. Douglas Jones of the University of Iowa, Dr. David Jefferson of Lawrence Livermore National Laboratory, and Howard Schmidt, former chief security officer for the Microsoft Corporation and former cyber security advisor to President George W. Bush. The task force called strongly for a robust hand audit, stating "an independent voter-verified paper trail without an Automatic Routine Audit is of questionable security value."<sup>1</sup>

Hand audits are no less essential to the security of elections than a voter-verified paper record. And audits are more quickly and easily done with optically scanned paper ballots than with the current generation of voter-verified paper audit trail (VVPAT) systems for direct-recording electronic machines (DREs). Election officials from Nevada testified to the Election Assistance Commission that the printers for the DREs have performed well since their introduction in 2004. In 2006, however, Cuyahoga County, Ohio officials reported serious problems using the printers. Problems included printer jams and missing vote records.<sup>2</sup>

Moreover, the current generation of VVPAT printers uses thermal paper rolls, which can smear, and are cumbersome to audit by hand. There is certainly the possibility that the voting machine companies will offer better options down the road, but right now we have an alternative: the voter-verified paper ballot, counted on a precinct-count optical scanner. Importantly, Dr. David Dill, a Stanford University computer scientist and founder of the Verified Voting Foundation, cites optical scan as the most consistently accurate method of counting votes.<sup>3</sup>

There are additional reasons to choose optical scan paper ballots over DREs with VVPAT:

- Optical scan paper ballots allow voting to continue even in the event of equipment failure. Voters can simply continue to mark their ballots, and poll workers can store the ballots for scanning later.
- DREs have shown higher undervotes than optical scan systems in studies done in Florida<sup>4</sup> and New Mexico.<sup>5</sup>
- Optical scan systems are easier for poll workers. With only one optical scanner needed per precinct, there is less time needed to set up and take down the voting equipment.
- Paper ballots are more intuitive to the voter.

- Optical scan ballots can easily accommodate more voters. As long as there are enough paper ballots available, an unexpectedly high turnout can be easily accommodated without requiring that voting machines be brought in to the precinct.
- DREs have higher ongoing costs, as demonstrated by studies of several North Carolina counties,<sup>6</sup> and by the Supervisor of Elections of Miami-Dade County, Florida.<sup>7</sup>

## **2. A rigorous chain of custody requirement, including video surveillance of the storage of paper ballots, between the closing of the polls and the commencement of the hand audit, and video surveillance of the storage of absentee ballots.**

Legislation should mandate the Brennan Center report's recommendations for chain of custody of election day records, except where those recommendations are already clearly mandated by Iowa election law. Below are the Brennan Center recommendations for chain of custody, quoted directly from page 15 of the report:<sup>8</sup>

### **“Chain of Custody of Election Day Records**

- At close of the polls, vote tallies for each machine are totaled and compared with number of persons that have signed the poll books.
- A copy of totals for each machine is posted at each polling place on election night and taken home by poll workers to check against what is posted publication election headquarters, the web, in the papers, or elsewhere.
- All audit information (*i.e.*, Event logs, VVPT records, paper ballots, machine printouts of totals) that is not electronically transmitted as part of the unofficial upload to the central election office is delivered in official, sealed, and hand-delivered information packets or boxes. All seals are numbered and tamper-evident.
- Transportation of information packets is completed by two election officials representing opposing parties who have been instructed to remain in joint custody of the information packet or box from the moment it leaves the precinct to the moment it arrives at the county election center.
- Each polling place sends its information packets or boxes to the county election center separately, rather than having one truck or person pick up this data from multiple polling locations.
- Once the sealed information packets or boxes have reached the county election center, they are logged. Numbers on the seals are checked to ensure that they have not been replaced. Any broken or replaced seals are logged. Intact seals are left intact.
- After the packets and/or boxes have been logged, they are provided with physical security precautions at least as great as those listed for voting machines, above. Specifically, for Pennasota [the task force's name for its model state], we have assumed the room in which the packets are stored have perimeter alarms, secure locks, video surveillance and regular visits by security guards and county police officers; and access to the room is controlled by sign-in, possibly with card keys or similar automatic logging of entry and exit by regular staff.”

The video surveillance requirement should also apply to the storage of absentee ballots.

### **3. A requirement that the hand audit of randomly selected precincts be completed before the county's canvass of votes, and that there be provisions for addressing discrepancies between the computer results and the hand-audit results.**

The state of Minnesota recently enacted a law requiring a post-election hand count of randomly chosen precincts.<sup>9</sup> Our recommendations use Minnesota's law as a starting point.

An Election Audit Board reporting to the Secretary of State should be created to supervise the hand audit. The board should consist of an equal number of Democrats and Republicans, nominated by the leaders of their respective parties in the General Assembly.

In counties with fewer than 50,000 registered voters, at least two precincts should be selected for the hand audit.

In counties with between 50,000 and 100,000 registered voters, at least three precincts should be selected for the hand audit. In counties with over 100,000 registered voters, at least four precincts should be selected for the hand audit.

In all counties, at least 5% of precincts should be hand-audited. If the number of precincts chosen according to the number of registered voters in the county is less than 5% of precincts, additional precincts should be randomly selected until 5% of precincts are chosen.

Elections for the President of the United States, United States Senator, United States Representative, and Governor should always be hand-audited. Additionally, in each precinct, at least two additional races should be chosen for auditing in a transparently random manner.

Votes would then be hand-counted according to the provisions of Iowa election law. If the hand-counted vote results for any office or question in that precinct differed by more than one half of one percent from the computer count for that precinct, at least three more precincts shall be randomly selected. If the race or question showing a discrepancy is on the ballot in less than three additional precincts, all precincts for that office or question would be hand-counted, and the hand count would serve as the official result. The canvass of votes for that county would not be completed before the expanded audit of three precincts.

If the expanded audit of three additional precincts reveals the vote tabulation for any precinct to differ by more than one half of one percent, the Election Audit Board would order additional audits at its discretion, including a full hand recount, if the board determines a full hand recount to be necessary.

The board should be required to render its decision at a public meeting. Decisions should be made by a majority vote of a quorum of the board.

If the Election Audit Board were to be equally divided among members who favor an expanded audit and members who oppose an expanded audit, the Secretary of State should be empowered to decide if an expanded audit is warranted. The Secretary of State would decide only the specific question before the board, e.g., the Secretary of State could not order a full recount if the board was divided on a question of an expanded audit.

### **4. A requirement for transparent random selection of precincts to be hand-audited.**

Legislation should mandate transparent random selection of precincts for the automatic routine audit as described in the Brennan Center report. The report emphasizes the importance of transparent random selection:<sup>10</sup>

**"The development of transparently random selection procedures for all auditing procedures is key to audit effectiveness."**

Transparently random selection is essential for a number of reasons. For one, it is self-evident to experts and citizens that if a partial hand audit will be used to detect error or fraud among all the precincts in the state, auditing a randomly chosen group of precincts is optimal.

Second, it is important to public confidence in the audit. We live in a nation in which 42% of people surveyed about the decline of gas prices that occurred in the fall of 2006 agreed with the statement that the Bush Administration "deliberately manipulated the price of gasoline so that it would decrease before this fall's elections."<sup>11</sup> Only transparent selection can prevent skepticism about the audit's validity.

Third, the hand audit will be our primary defense against fraud or error in the vote total. Unless a public consensus in favor of hand-counted paper ballots develops, America is likely to use computers to tabulate votes for the foreseeable future. All practical steps that can be taken to make the audit reliable should be taken.

Finally, election officials have benign motivations to cherry-pick precincts to audit. In 2004, the state of Ohio conducted a recount of the Presidential election at the request of the Green Party and Libertarian Party candidates. At the time, the state required that a random sample of 3% of precincts be counted by hand. In the state's largest county, Cuyahoga County, election officials were indicted for failing to randomly select precincts for the hand audit.

Whether or not they were guilty, election law expert Daniel Tokaji noted that they could well have had a benign motivation: the desire to avoid the headache of a full recount.<sup>12</sup>

**"That said [that the indicted election officials are presumed innocent until proven guilty], I wouldn't be terribly surprised if the allegations were true. Given the substantial margin by which President Bush won in Ohio (over 136,000 on election night, later reduced to around 119,000 after provisional ballots were counted), there was almost no chance that a recount would uncover enough votes for Senator Kerry to affect the outcome. Under these circumstances, it's plausible that local election officials cut corners to avoid what likely seemed to them a pointless recount."**

Moreover, when the Brennan Center investigators surveyed the dozen or so states that do conduct hand audits, they found a pattern of failure to select audited precincts randomly.<sup>13</sup>

**"In our interviews with election officials we found that, all too often, the process for picking machines and auditors was neither transparent nor random."**

The report also stresses the need for the selection to be open to the public and to political party observers, and for the process to be videotaped.

The Brennan Center report discusses possible methods of random selection in an appendix to the report.<sup>14</sup> The method of using three 10-sided dice, and assigning each precinct or voting machine a number based on the possible combinations of dice rolls, seems particularly simple and accessible.

The selection of precincts should take place immediately before the commencement of the hand audit in each county, at the location where ballots have been securely stored as defined in the recommendation for chain of custody of election day records. The audit should commence immediately upon the selection of precincts. If the ballots should need to be removed from the storage area to another building for the audit, any citizen or political party observer should be able to witness the transportation process.

## 5. A requirement that all software used in elections be disclosed to the public upon request.

The public disclosure of vote-counting software is a provision of U.S. Representative Rush Holt's bill H.R. 550, the Voter Confidence and Increased Accessibility Act.<sup>15</sup> H.R. 550 now has 219 cosponsors, a majority of the U.S. House of Representatives in the 109<sup>th</sup> Congress.

H.R. 550 would amend the Help America Vote Act (Section 247 (c)(8)) to read:<sup>16</sup>

**"No voting system shall at any time contain or use any undisclosed software. Any voting system containing or using software shall disclose the source code, object code, and executable representation of that software to the Commission, and the Commission shall make that source code, object code, and executable representation available for inspection upon request to any person."**

We believe that Iowa election law should include very similar language, specifying also central tabulating software and ballot definition files.

Software disclosure is a notion that seems counter-intuitive to many laypeople. If the computer code is available to the public, are not the voting systems more vulnerable to hacking? What about voting machine companies' commercial interest? Here are some essential points regarding disclosure:

- Disclosed software is not the same thing as open-source software. Open-source software is not protected by patents and copyrights, as Bruce Perens of the Open Source Initiative has noted.<sup>18</sup> Under a disclosed software requirement, voting machine companies could retain the exclusive right to sell their software for use in elections, but the public could examine the software and test it for faulty or malicious code.
- According to the computer consulting firm E-Soft, Inc., as of September 2006, 52.6% of Web sites using secure servers, including e-commerce sites, used the Apache server.<sup>19</sup> Apache is an open-source server whose code is publicly available for anyone to examine.<sup>20</sup> A majority of companies and organizations that require secure Web sites have flocked to a system whose software is public knowledge.
- The open-source operating system Linux has obtained an international Common Criteria security certification that will enable Linux "to be adopted by governments and government agencies for mission-critical and command-and-control operations."<sup>21</sup> The public disclosure of software is compatible with the highest level of security.

Earlier this year Wisconsin came within a hair's breadth of enacting software disclosure, but the language on disclosure was deleted in the final stages of the legislative process.<sup>25</sup> Iowa should take the lead in bringing transparency to electronic voting.

## 6. A requirement for public disclosure of the tests performed by the "independent testing authorities" (ITAs).

Johns Hopkins computer security expert Aviel Rubin has written a very accessible- and disturbing- article on the process by which voting machines are tested, "The Dirty Little Secrets of Voting System Testing Labs."<sup>26</sup>

Most states do not conduct their own review of voting machine software. They depend on the work of these "independent testing authorities" which are paid by the voting machine companies to evaluate the security and reliability of their products. The conflict of interest is obvious. Iowa is unlikely to change this part of the process, and as University of Iowa's Dr. Jones has noted, the for-pay review system is common in many industries.<sup>27</sup> What is pernicious about this system, and what Iowa should change, is the

secrecy of the testing process. Iowa legislation should require that ITA reports, and the methodology and results of all tests performed on the machines, be made public.

Additionally, Iowa should consider creating its own panel of computer experts to conduct post-ITA review. California has an expert panel that has been the source of much of the most rigorous criticism of the security of Diebold voting machines. Dr. Jones would be a valuable resource in drafting legislation to create a state-based panel to conduct meaningful testing of machine software.

## **7. A system for “auditing the Auditors” following each election.**

The Election Audit Board should audit a randomly chosen number of counties after each election, and audit the county Auditor’s conduct of the election for conformity to Iowa election law. Selection of counties to be audited should be transparently random, as described in the Brennan Center report.

## **8. A ban on ballot programming by the voting machine companies, accompanied by assistance from the Secretary of State for counties who lack the resources to do their own programming.**

Most counties in Iowa, and many across the nation, depend on the voting machine vendor they use to do each election’s “ballot programming,” the configuration of the voting machines for each unique election. This process generally undergoes no audit of any kind.<sup>28</sup> It was a ballot programming error that caused the well-known erroneous machine count in Pottawattamie County’s election on June 6, 2006.<sup>29</sup>

The machines in Pottawattamie County were apparently not tested, as Iowa Deputy Secretary of State Charles Krogmeier noted in his talk at the Iowa League of Women Voters Legislative Issues Briefing on October 14, 2006. But even when the machines are tested, they are often not tested in election mode. And it is possible that the ballot definition files could contain additional programs. Software expert Ellen Theisen wrote in an analysis of the ballot programming issue:<sup>30</sup>

**"While the ballot definition is primarily data, it could contain a program that would affect the results, yet it is not passed through any independent audit."**

The Brennan Center report recognized the problem as well, and recommends local control of ballot programming:<sup>31</sup>

**"Where a single entity, such as a vendor or state or national consultant, performs key tasks for multiple jurisdictions, attacks against statewide elections become easier."**

Since most counties that rely on their machine vendors to do ballot programming do so for lack of their own resources, Iowa legislation should empower the Secretary of State to assist counties do their own ballot programming, and provide appropriate funding. Ballot programming assistance should be administered through a board reporting to the Secretary of State and consisting of an equal number of Democrats and Republicans.

The ballot definition files should also be available for auditing by citizens and political party observers.

## **In Conclusion**

The recommendations we have outlined are measures that experts in elections and in computer security believe are of vital importance to election integrity. They are not intended as a comprehensive set of

reforms, but as essential starting points from which to bring Iowa's election laws, long known for their rigor and fairness, up to date in the age of electronic vote-counting.

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