

**IN THE CHANCERY COURT FOR DAVIDSON COUNTY, TENNESSEE
20TH JUDICIAL DISTRICT, AT NASHVILLE**

EDWARD THOMPSON,)	
)	
and)	
)	
COMMON CAUSE TENNESSEE,)	
)	
Plaintiffs,)	
)	
vs.)	Civil Action No. 09-1882-IV
)	
TRE HARGETT, In His Official Capacity as Secretary of State of Tennessee,)	Chancellor Perkins
)	
MARK GOINS, In His Official Capacity as Coordinator of Elections of State of Tennessee,)	
)	
and)	
)	
JUDY BLACKBURN, TOM DUBOIS, GREG DUCKETT, TOMMY HEAD, JIMMY WALLACE, TOM WHEELER, AND KENT YOUNCE, In Their Respective Official Capacities as Members of the State Election Commission of Tennessee,)	
)	
Defendants.)	
)	

AFFIDAVIT OF DOUGLAS W. JONES

1. My name is Douglas W. Jones. I am above 21 years of age, am of sound mind and body, and am otherwise competent to testify. I make the following statements of my own personal knowledge and would so testify if called upon to do so.

2. I am an Associate Professor in the Computer Science Department of the University of Iowa, and I live at 816 West Park Road, Iowa City, Iowa.

3. I received my BS in physics from Carnegie-Mellon University in 1973, my MS in computer science from the University of Illinois in 1976, and my PhD in computer science from the University of Illinois in 1980. I joined the faculty of the University of Iowa in 1980, where I have worked since.
4. In 1994, I was appointed to the Iowa Board of Examiners for Voting Machines and Electronic Voting Systems, where I served until 2004. From 1999 to 2002, I chaired this board. This board is appointed by the Iowa Secretary of State and examines and makes recommendations regarding all voting systems offered for sale to Iowa counties.
5. I have consulted about voting machinery and election administration with Miami-Dade County, the Arizona Senate Government Accountability and Reform Committee, the Organization for Security and Cooperation in Europe, and others.
6. I have testified about voting machinery and election administration before the United States Commission on Civil Rights, the House Science Committee, the Federal Election Commission, the Election Assistance Commission Technical Guidelines Development Committee and others.
7. I wrote Chapter 1 of *Secure Electronic Voting*, Dimitris Gritzalis, ed., Kluwer Academic Publishers, 2002, entitled "Evaluation of Voting Technologies." I wrote Appendix E of *The Machinery of Democracy -- Protecting Elections in an Electronic World, Report of the Task Force on Voting System Security*, Lawrence Norden, ed., Brennan Center for Justice, 2006, on Testing Voting Systems. I also have a forthcoming chapter in *Towards Trustworthy Election Systems*, David Chaum, ed., Springer, 2009, entitled "On Optical Mark Sensing," as well as other publications.

8. I have served as an expert witness in *Conroy v. Dennis*, District Court of the City and County of Denver, Colorado, September 20-22, 2006; *In the matter of primary election ballot dispute 2008*, Supreme Judicial Court of Maine, July 7, 2008; and *NAACP v. Cortes*, U.S. District Court for Eastern Pennsylvania, October 28, 2008. All of these cases involved voting machinery and election administration.
9. Scheduling the introduction of new voting equipment into a jurisdiction should be done with care because the first use of new equipment is a learning experience for election administrators, poll workers and voters.
10. I recommend that the first use of new equipment be in small local elections with relatively low profile and relatively low turnout so that, by the time there is a major election using the new equipment, many of the poll workers and many of the voters will already have used the new system.
11. I also recommend that primary elections be run on the same equipment as used in the following general election.
12. Poll worker training for new voting equipment and mailing of absentee ballots must begin at least a month before an election, and this requires that training materials and ballots be prepared by then.
13. Training of county election administrators should be completed before ballot design begins. This training should use the system that will be used in the real election.
14. Based on the above, I recommend that the deadline for delivery of samples of the voting system sufficient for training county election administrators be three months before the first

use of that equipment, and that sufficient equipment for poll worker training be delivered two months before the election.

15. All equipment needed for the election should be in place no later than one month before the election so that there is adequate time for acceptance testing and pre-election testing.
16. I understand that the election calendar in Tennessee schedules local elections in May 2010, a primary in August 2010, and general elections in November 2010.
17. This leads me to recommend that delivery of equipment and documentation for equipment to be used in the November 2010 general election should be during February 2010, in order to allow its first use in the May 2010 elections.
18. This suggests to me that it would be prudent to complete the final purchase agreement with the voting system vendor in January and that the bidding process to select a vendor should be completed in December.
19. I understand that Tennessee requires that new voting systems used in the state conform to the Voluntary Voting System Guidelines promulgated by the Election Assistance Commission (EAC).
20. The Voluntary Voting System Guidelines are currently under revision. The 2005 edition was a revision of the Federal Election Commission (FEC) 2002 Voting System Standards, while those were, in turn, a revision of the 1990 Voting System Standards.
21. The change in terminology from Voting System Standards to Voluntary Voting System Guidelines was a consequence of the Help America Vote Act of 2002 and does not reflect any fundamental change in the nature of these documents. Compliance with these standards

has always been voluntary, from a federal perspective, while many states have enacted legislation requiring conformance with these documents.

22. The evolution of these documents reflects our growing understanding of the requirements to which electronic voting systems should be held. Each revision corrects weaknesses in previous documents through a political process involving election administrators, voting equipment vendors, elected officials, and the public.
23. There will always be a significant delay between the promulgation of new versions of the voting system standards or guidelines and the availability of equipment certified to them.
24. The change in supervision of our voting system standards from the FEC to the EAC added significant delays to the certification process as a result of changes in the accreditation requirements for the voting system testing laboratories.
25. As a result of the above circumstances, few voting systems have yet been certified to conform to the 2005 guidelines and most of the systems currently being sold are only certified to the 2002 standards using a certification process designed by the FEC. In fact, many systems currently undergoing certification will be certified to the 2002 standards and not the 2005 guidelines.
26. This raises a natural question. Is it better to wait for equipment to be certified to the 2005 guidelines or is it better to take what is currently available that meets the 2002 standards?
27. Note that by the time a full range of equipment is available certified to the 2005 guidelines, it is quite likely that there will be a new 2010 edition in place. As a result, it will always be possible to argue for delaying purchase until better equipment is available that is certified to the newest standards.

28. It is my understanding that several systems currently certified to the 2002 standards have been submitted for certification to the 2005 guidelines. For these systems, when they complete the new round of certification, it should be possible to upgrade equipment already certified to bring it into compliance with the new guidelines.
29. Systems currently undergoing certification to the 2002 standards are being subjected to a new certification process under the EAC. This is more rigorous than the process formerly used under the FEC. As a result, I believe that new certifications under the old standards actually mean more than old certifications under the same standards.
30. The state clearly has the option of requiring that, if a systems offered for sale to the state was certified to meet the 2002 standards under the FEC process, it must have been submitted for certification under the EAC process, or that it must have been submitted for certification to the 2005 guidelines. The state can also require that the system be field upgradable to meet any changes required by the current round of certification testing and that such a field upgrade not require replacement of entire machines.
31. There are two strong arguments for not waiting for equipment to be available that is certified to meet the 2005 Voluntary Voting System Guidelines. Existing equipment is wearing out and will need replacement, and existing equipment may not provide a sufficient guarantee that all voters will have an equal likelihood of having their votes counted.
32. Current touch-screen direct-recording electronic voting machines are made with numerous components originally designed for laptop computers. As such, I expect these machines to have useful lifetimes comparable to laptop computers, which is to say, while many machines

will remain useful 10 years after purchase, I would consider replacement after 5 to 7 years to be prudent.

33. I understand that two primary classes of voting systems are in use in Tennessee, precinct-count optical mark-sense voting systems and touch-screen direct-recording electronic voting systems.
34. I understand that the touch-screen voting systems are more likely to be used in counties with high minority population, while the mark-sense systems are more likely to be used in counties with lower minority populations.
35. A comparison of the likelihood that votes will be counted correctly on touch-screen and mark-sense systems is therefore relevant.
36. The Caltech/MIT Voting Technology Project released a revised report on March 30, 2001, entitled “Residual Votes Attributable to Technology” by Stephen Ansolabehere and Charles Stewart III, subsequently published in *The Journal of Politics* in 2005 (volume 67, page 365). This report found that hand-counted paper ballots, mechanical lever voting machines, and optically scanned ballots had a lower residual vote than direct-recording electronic voting machines.
37. Many comparisons of voting systems have used the residual vote as the measure of voting system accuracy. The residual vote is the difference between the turnout, on the one hand, and the sum of valid votes in a contest, on the other hand. It includes deliberate abstentions as well as errors that cause voters to register no preference in that contest.
38. The residual vote does not include “misvote” or wrong-choice errors – that is, errors where the voter intended to vote for one candidate but instead voted for another.

39. Erzo Luttmer and Kelly Shue studied misvotes in the California Gubernatorial Recall election of 2003. Their study, “Who Misvotes? The effect of Differential Cognition Costs on Election Outcomes,” was released through the Social Science Research Network in November 2006.
40. Luttmer and Shue showed that the incidence of misvotes due to adjacency errors had both partisan and ethnic components that were large enough to swing election outcomes in several recent close elections.
41. Bryan A. Campbell and Michael D. Byrne of Rice University presented a paper entitled “Now Do Voters Notice Review Screen Anomalies? A Look at Voting System Usability,” at the 2009 Electronic Voting Technology Workshop/Workshop on Trustworthy Elections in Montreal on August 10, 2009.
42. Andrea Mascher, Paul Cotton, and I have presented a paper entitled “Improving Voting System Event Logs” at the 2009 First International Workshop on Requirements Engineering for E-voting Systems in Atlanta on August 31, 2009.
43. Campbell and Byrne found that wrong-choice errors were two to three times more common than errors recorded as undervotes on their experimental touch-screen direct-recording electronic voting machine.
44. Touch-screen electronic voting systems provide a review screen that is intended to allow voters to detect and correct wrong-choice errors.
45. Campbell and Byrne found that only about one voter in three notices errors in the votes recorded on a typical voting machine review screen, when voting for fictional candidates. Mascher, Cotton, and I confirmed the ineffectiveness of review screens, finding only about half the voters noticed the exchange of McCain and Obama votes on the review screen.

46. Our work also shows that voters have high confidence in touch-screen voting systems, even when the system lies to them on the summary screen about who they voted for and even when the touch screen is deliberately out of adjustment, increasing the likelihood of wrong-choice errors. When they do notice errors, our subjects tended to blame their own error, not the machine, when in fact, we made the machine deliberately misrecord their votes.
47. It is noteworthy that, in the event of a post-election controversy, mark-sense ballots preserve considerable evidence that can be examined to determine what happened. In contrast, current touch-screen direct-recording electronic voting systems do not record enough evidence to determine what went wrong.
48. For example, in the November 2006 election in Sarasota County, Florida, 12.9 percent of the votes cast in Florida's 13th District congressional race were undervotes. Many voters voted on paper absentee ballots, where the undervote rate was just 2.5 percent, while the undervote rate for voters using the county's touch-screen system was 14.9 percent. It seems obvious that something was wrong.
49. Florida conducted an extensive post-election forensic investigation, reaching no useful conclusion about what happened in Sarasota County. This investigation could have been more complete, as documented in "Stones Unturned – Gaps in the investigation of Sarasota's disputed congressional election," a white paper by David L. Dill and Dan S. Wallach, April 13, 2007.
50. I conclude that current direct-recording electronic voting machines do not record sufficient evidence to permit sound conclusions about what went wrong when something does go wrong, and that reliance on voter approval of summary screens on such voting machines to

assure that the vote recorded is correct is fundamentally flawed because an insufficient number of voters check the review screen.

51. In contrast, paper-based optical mark-sense voting systems preserve sufficient evidence.

The Minnesota senatorial recount of 2008 illustrates the value of this evidence.

52. It is noteworthy that the Minnesota recount shows that centrally counted absentee ballots were significantly more likely to be subject to controversy than ballots cast using precinct-count mark-sense scanners.

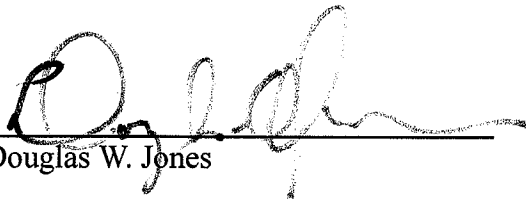
53. Regardless of how well touch-screen direct-recording electronic voting systems may work when there are no problems, they preserve so little information that it is not always possible to know if anything went wrong. When things do go wrong, I believe that voters' chances of having their votes counted correctly are significantly higher with precinct-count optical mark-sense voting systems.

54. As a result, I believe that voters using precinct-count optical mark-sense voting systems have a significantly higher likelihood of having their votes counted and counted as intended than voters using current touch-screen direct-recording electronic voting machines.

55. In summary, I recommend that Tennessee move promptly to replace touch-screen direct-recording electronic voting systems with precinct-count optical mark-sense voting systems. I recommend that this new equipment be placed in service for the May 2010 local elections, and, therefore, that a vendor be selected by the end of this year. I believe that doing so is important in order to ensure that all voters in the state have an equal likelihood of having their votes counted.

56. I certify that the foregoing statements are true.

FURTHER AFFIANT SAITH NOT.



Douglas W. Jones

Sworn and subscribed to before me

this 19 day of October, 2009.



NOTARY PUBLIC

My Commission Expires

