

From: [REDACTED]
Sent: Wednesday, January 25, 2006 4:35 PM
To: [REDACTED]
Subject: FW: patch information and more

-----Original Message-----

From: Sinkule, Kara [mailto:ksinkule@sos.state.ga.us]
Sent: Wednesday, January 25, 2006 4:04 PM
To: [REDACTED]
Subject: patch information and more

[REDACTED] Attached is a response to your question regarding the patch applied to Georgia's electronic voting equipment in 2002. I can also fax you letters received from the two testing laboratories Wyle and Cyber after the "patched" system was sent back through and certified. Just let me know your fax #. I would PDF them but I am afraid you would not be able to read them clearly as they are several years old now. Chris Riggall, our press secretary is in a meeting this afternoon (we are currently in the throws of our legislative session) and it doesn't look like he is going to be able to get out in time to call you. If you scroll down, I have addressed your other questions below. Please let me know if you need additional info and I will try to provide.

Regards,
Kara Sinkule
Press Office
Office of Secretary of State
814 MLK Jr., Drive
West Tower
Atlanta, Georgia 30334
(404) 657-4597

During June and July of 2002, new voting equipment was being delivered to counties throughout the state of Georgia. The software installed on these systems had been nationally qualified and state certified. As equipment was distributed, verification tests, conducted by the Center for Election System at KSU, were run on all equipment delivered by Diebold to awaiting counties. These tests were conducted to verify that the systems being installed in the counties matched what had been qualified and certified for use. Samples audits were done at the Diebold warehouse in Fulton County, with 100% of the shipped units being tested after they were received by the counties.

Two counties were scheduled to use the new voting system to conduct their 2002 General Primaries in August of that year (Hall and Marion counties). During the pre-election testing phase leading up to the Primaries, an extremely high level of screen freezes began to appear on the voting units. A screen freeze was characterized as an instance when a person would be using a voting unit to review a ballot and cast a vote, but during that process the voting unit would not recognize the touch of the voter. The page displayed simply froze on screen. The simple cure was to turn the voting unit off and then power the unit back on. A unit that is restarted in this fashion does not lose any of the archived or current voting information, with the exception of the vote that was interrupted. When the unit was turned back on, the voter access card residing in the voting unit was automatically ejected and the voting unit returned to the

1/25/2006

main screen and indicated that all ballots cast prior to the unit being powered down remained within the system. The affected voter was given a new card and either tried to use the same unit again or was forwarded to another voting unit.

Screen freezes were not an entirely new phenomenon. They had been detected by KSU during their field-testing, but the number of instances was not as high as what was beginning to appear in Hall and Marion counties. Our office also began to hear about more instances of screen freezes from our voter education coordinators who were traveling the state conducting demonstrations. Our office was highly concerned that with the high number of screen freezes now appearing, that perhaps there was a problem.

We discussed the issue with Diebold and asked them to please investigate and determine what could be causing the high number of screen freezes being experienced. The determination relayed to us was that the operating system on the voting units (WIN CE 3.0) was not properly communicating with the ballot station software, which was used on the voting unit to display ballots and collect votes. It was explained to us, that the screen freezes seemed to be the result of a disrupted communication link between the two programs. When the programs didn't talk to one another, the unit just stopped. The process of turning the unit on and off when this happened re-established the connection and the machine would then function as intended or until the communication disruption happened again. The turning on and off of the unit would not affect the vote totals on the unit in any way, but it could create significant voting delays at voting precincts. Furthermore, it could negatively impact public confidence in the system.

With that knowledge, we asked what could be done to correct this issue. It was explained to us by Diebold, that they had developed a "patch" to the system that would strengthen the communication link and minimize the occurrence of screen freezes. When we were informed of this option, we immediately discussed the possibility of installing this "patch" to the units to reduce the occurrence of screen freezes. However, we also realized that the change to the voting system could affect its standing as a qualified and certified system.

Dr. Brit Williams of KSU contacted the national testing labs (the ITAs) that conduct the national qualification tests to discuss with them the situation. As a result of those and other discussions focusing on what possible affects the "patch," as explained, could have on the collection and recording of votes, we decided to test the patch in a controlled environment to ensure that 1) it corrected the screen freezes, and 2) it still passed our state acceptance tests. No adverse affects had been observed during a review of the "patch," so a final decision was made to allow the "patch" to be installed on the units which were scheduled for use in the August 2002 primaries in Hall and Marion counties. Further installation of the "patch" on other units in the field would not be made until the successful completion of Logic and Accuracy testing in those counties. In addition, no "patch" installs were made anywhere else until the elections in Hall and Marion were completed and successful.

It is important to note that the "patch" was applied not to the firmware, (known as the Ballot Station software), which actually records and compiles the votes, but rather to Windows CE, which is the operating system that gives the unit its basic functionality. Merle King notes that Microsoft, nearly on a daily basis, posts "service packs," which are software upgrades or "patches" to Windows CE and other Windows applications, to their website on a weekly or sometimes even daily basis. The phenomenon of making modifications to an operating system to correct anomalies or improve functionality is not uncommon in the least.

As a result of the install, occurrence of screen freezes in Hall and Marion were virtually eliminated. Units in the field that were placed in other counties for demonstration purposes on Primary Day did not fare as well. Throughout the day, our office fielded several calls from across the state indicating that the demonstration units were experiencing screen freezes.

With the success experienced in Hall and Marion, a decision was made to allow the installation of the "patch" to the remaining units in the State in time for the November elections. It was also decided, that at the conclusion of that election, the entire voting system, including the "patch", would be sent through another round of qualification and certification testing. We greatly desired to have the tests run before the November elections, but there was not enough time to send the software packages back for testing. A return to the labs would have prevented the use of the voting equipment in November. The November deadline had been established earlier that year by the General Assembly, plus Georgia, as a Section V state under the Voting Rights Act, had already obtained federal pre-clearance to use the voting equipment in November. A change in that plan would have forced the state to once again seek pre-clearance from DOJ before any voting equipment could be used in November, new or old, thus jeopardizing the ability to conduct an election at all.

The "patch" was installed, KSU verified that the correct version of the software had been installed in the counties, and the November elections were conducted. While there were sporadic reports of screen freezes around the state, there were not enough to cause any major delays in the voting precincts. All in all, Election Day was a smooth experience.

In December 2002 the entire voting software package including the "patch," was submitted for qualification and certification testing. The system cleared both hurdles successfully. With these tests completed, a copy of the software package was escrowed by the State, (as has had been done with the previous version) and Diebold was allowed to install the qualified and certified system on the state's voting units. KSU then verified this installation by visiting every county and comparing the system installed with the escrowed copy. If the copies did not match, then the equipment could not be used. This verification process, begun well before the introduction of electronic voting in the state, is still performed today with any new purchase of voting equipment in the state. Before the new equipment can be used in an election, KSU has to verify that the system installed on the equipment matches what has been qualified and certified.

So, to summarize,

- The "patch" was developed and deployed to correct an unexpected problem created by a new release of Windows CE, which we utilized because it had more robust audio capabilities. The new version of CE created a conflict between it and the Ballot Station firmware, which in an unacceptably high number of cases created a screen freeze on voting units.
- Before deploying the patch to CE, our KSU experts consulted with the ITAs who concurred this was an acceptable approach. While highly desirable, a full federal re-certification was not mandatory, since it did not effect the firmware itself.
- KSU experts tested the "patch" before deploying it to Hall and Marion counties for use in the Primary.
- The Hall and Marion experience demonstrated that the "patch" was effective in correcting the conflict. Such an upgrade to a Windows operating system is extremely common as Microsoft regularly releases corrective improvements to their software across the board.
- Full deployment of the patch to CE was implemented and statewide the screen freeze anomaly was nearly completely eliminated.

- Following the election, an entire new round of federal testing and certification of the platform, including the “patched” operating system, was conducted by the ITA. No flaws were found and the entire package was certified.
- There is absolutely no evidence whatsoever that any of the measures taken to correct the conflict had any impact on the accuracy of the system. To the contrary, there is enormous evidence, including the ITA’s post-election testing, that the system was uncompromised.
- The claims made against the “patch” are somewhat ironic in that Georgia’s regimen for testing and analysis probably exceeds that of any other state. Many states do not require federal certification and testing at all. Few conduct the intensive state level certification regimen we do. Many states do not perform public L&A on each and every unit. Recent events made it clear that California, for example, doesn’t take steps to confirm that the correct certified version of software is loaded on the voting units. No other state has the “hashing” program to further insure that the correct and unadulterated software is in use. And no other state has independent academic experts on hand to review and weigh in on all of these decisions.

You asked about the extent to which we still contract with Diebold for technical support. As we discussed the greatest presence of technical support by Diebold was during our rollout in 2002. Since that time many of these support responsibilities have been handled by the staff of the Center for Election Systems at Kennesaw State University. However, as funds are available, counties can still choose to utilize 1 Diebold technical support person per county if they choose to. If they are going to be doing the activities you described to me from your interview, they are required to take an oath administered by the county and are to do their work under the supervision of the local election superintendent. Certainly there are variations in comfort among county officials and some choose not to utilize outside technical support.

But it is important to note that vendor assistance and technical support is extremely common throughout the country with any type of election equipment whether it be an opti-scan or electronic platform.

I have also attached information on our security features and testing:

Security Features of Georgia’s Electronic Voting System

Recent reports published by academics, computer scientists and software security professionals have raised questions about security with electronic voting systems. It is important to note that these reports have been written by computer scientists who admittedly know very little about how elections are administered and completely disregard the internal and external security measures in place for Georgia elections.

Prior to its use in Georgia the electronic system underwent three levels of testing. The first level of testing consisted of **Qualification Tests**. These tests are specified by the Federal Election Commission (FEC) and administered by the National Association of State Election Directors (NASED). Independent Testing Authorities (ITAs) selected and qualified by NASED conducted the qualification tests. ITAs are national software and hardware laboratories located throughout the nation. The tests they conduct evaluate the design and manufacture of the system as well as the accuracy and security. The

hardware is also subjected to extreme environmental conditions such as high and low temperatures, vibration, high humidity, dust, and drops from various heights.

Once the system successfully completed Qualification Testing it was brought into the state for **Certification Tests**. There are three main purposes for certification tests. One purpose of the certification tests is to test the system for compliance with the State's Election Code and Regulations. The second purpose is to evaluate the complexity of installing and using the system. The third and most extensive test is to verify that the system records and tallies votes correctly. This is accomplished by simulating a typical Georgia election. Every aspect of this test, ballot size, number of voters, length of questions, election date, etc., is identical to the conditions that occur in a Georgia election. At the conclusion of this test the results from the electronic voting system are compared to the known inputs to the test.

The third level of tests is **Acceptance Testing**. These tests were conducted in the offices of the local election jurisdictions to verify that the voting system that was delivered to the counties is functioning properly and is identical to the system that was evaluated during Qualification Testing and Certification Testing.

The Security of our voting system is paramount. Extensive measures are taken to protect the voting system from fraud. During testing the function of each program module is determined and each module is examined to ensure that there is no 'hidden' code. When the software/firmware is approved various electronic signatures are recorded to verify that the original code has not been altered.

Each time the system is delivered to a Georgia county, the electronic signatures are examined to verify that the system as delivered is identical to the system that successfully completed qualification tests. During acceptance testing these signatures were examined to ensure that the certified system was delivered to the counties. Each time the system is used in an election these signatures are examined both before and after the election to ensure that the system has not been altered.

An additional level of testing conducted before every election, **Logic and Accuracy Testing**, is conducted prior to every election, to check the performance of all systems and verify specific ballot information for each memory card in each precinct is correct and that votes cast on the system are properly recorded on the voting terminal. After "L&A" is completed, units are set in election mode, powered down, locked and banded with a seal that is not broken until Election Day.

With these, and other overlapping layers of safeguards in place, attempts to alter the system software would be easily detected. Additional physical security systems are in place in the facilities where the equipment is housed and standard security measures are in place in each precinct on Election Day. Multiple, overlapping audit trails of the number of voters who have voted and the number of ballots cast as well as votes that were cancelled are recorded in each precinct on election day. After the polls close these numbers are reconciled with the numbers produced by the electronic voting system during the vote tally and any "extra" votes or cancellations would be immediately identified.

It is also important to point out that Logic and Accuracy Testing that is performed in each county before every election is completely open to the public. Interested parties can join poll watchers, candidates and elections officials and watch as the machines are tested, locked and sealed on the spot. Testing schedules for upcoming elections are available at the local county elections office. Similarly, the tally of the votes in the county election office on election night is open to the public and is usually observed by party representatives, candidates or their representatives, members of the media, and other interested citizens.

Regarding your question on what Secretary of State Cathy Cox thinks about the performance of the equipment:

Secretary Cox: New Data Shows Voting Accuracy Soared in 2004 Presidential Contest in Georgia November 18, 2004

ATLANTA ... Secretary of State Cathy Cox today released newly compiled data from Georgia's November 2nd General Election showing that the accuracy of the vote count increased dramatically compared to the presidential election four years ago. Secretary Cox said the improvement was attributable to the deployment of a uniform electronic voting system in 2002.

Secretary Cox said the improvement in accuracy resulted in more than 103,000 additional Georgia ballots being properly counted in the presidential race this year.

In the presidential election in 2000, Georgia's undervote rate (sometimes called the residual vote rate) which is the percentage of ballots that registered no choice in the presidential race, was 3.5% of ballots cast. Academic researchers with the CalTech/MIT Voting Technology Project found that Georgia's undervote rate in 2000 was the second-worst in the nation.

Final data from the 2004 General Election reveals that the presidential undervote rate in this year's election plummeted – dropping nine-fold, to only 0.39%. Out of more than 3.3 million ballots cast this year, only 12,843 ballots registered no choice for president.

"This new data makes clear that the adoption of a modern system of electronic voting dramatically improved the accuracy of the vote count in Georgia," said Secretary of State Cox, who serves as the state's chief elections official. "If you apply the high undervote rate we experienced four years ago to the huge turnout we had this year, we would have had more than 103,000 additional lost votes in the presidential election in 2004. In other words, modernizing our voting system resulted in 103,000 more Georgians having their presidential choice counted this year. To improve voting accuracy by such a huge margin may be unprecedented in American electoral history. Four years ago, no state, whatever their voting method, had an undervote rate as low as 0.39%, the number we recorded on November 2nd. Georgia has gone from a laggard to a leader in voting accuracy, and our citizens now have the assurance that the votes they cast will be accurately recorded and counted," Ms. Cox added.

Researchers indicate that, even in a presidential contest using the most accurate voting equipment, some small number of voters will intentionally abstain from selecting a candidate. While achieving a statewide undervote percentage of zero is not a realistic goal, a modern touch screen voting interface that prohibits overvotes (improperly selecting more than one candidate) and offers users a review screen so they can see and, if necessary, correct their choices before a ballot is cast, provides voters a much better opportunity to reduce inadvertent error. Votes tabulated electronically are also not subject to tabulation errors that can occur with punch card and other paper-based voting systems.

The November 2nd General Election was the fifth major statewide election to utilize the uniform statewide electronic voting platform, which was first deployed for the November 2002 General Election. In addition, several hundred local, municipal and special elections have been conducted using the touch screen terminals.

Opinion polling has consistently shown that Georgians are more confident in the voting process today than they were before the deployment of electronic voting. In exit polling conducted Nov. 2nd for the broadcast networks, CNN and other major news organizations, Georgians were shown to be above the national average, and significantly above the average for southern states (+5%), in expressing confidence that their vote would be accurately counted. Floridians, for example, were 17 percentage points more likely than Georgians to say they were not confident that their votes would be counted.

Other points of interest from the new data that compares undervotes in 2000 to 2004:

- Four years ago the county with the highest undervote percentage in the state was Randolph, with a rate of 15%, followed by Bacon County with a rate of 10.5%. In 2000 some 56 Georgia counties recorded an undervote percentage of 5% or higher.
- This year, the county with the highest percentage was Taliaferro, with a rate of 2.26%, followed by Hancock at 1.77%. Those higher-than-average rates were primarily attributable to paper absentee ballots, the data shows. In 2004, 62 Georgia counties recorded undervote rates of 0.5% or below.
- In 2004 the county with the lowest undervote percentage was Forsyth, at 0.12%. Only 66 Forsyth ballots out of 56,985 cast in the county showed no choice in the presidential race.

- The undervote rate among voters who cast ballots via touch screen on Election Day was only 0.35% – a bit lower than the overall percentage of 0.39%. Among absentee and early voters, (which includes a substantial number of paper optical scan ballots) the rate was 0.52%. For provisional ballots, which are always cast on paper optical scan ballots, the presidential undervote rate was 1.16%.

A study of Georgia's deployment of electronic voting and its impact on the 2002 election, released last month by Dr. Charles Stewart of MIT, one of the nation's foremost experts on voting system accuracy, noted, *"Following the 2000 presidential election, the state of Georgia instituted the most comprehensive overhaul of voting technology in the country...Although the Nation's eyes were on Florida, a case could be made that it was Georgia that deserved the scrutiny. Georgia's "residual vote rate," a measure of "lost votes" that has come to be used widely to measure voting technology reliability, was 3.5% – the second worst in the country, behind only Illinois...This paper shows that the implementation of the Diebold system produced a significant reduction in the residual vote rate throughout the state of Georgia. Just as important, the implementation of the new machines removed gaping disparities in voting machine reliability that could have raised serious questions about the fairness of Georgia's electoral system. DREs are more reliable, their performance varies less across the state, and the least advantaged areas of the state have experienced the greatest gain in reliability."* 3,317,336 ballots were cast in this year's election. Georgia's undervote rate four years ago was 3.5%. If that rate had prevailed this year, 116,106 presidential undervotes would have been recorded. The number of undervotes actually recorded in 2004 was only 12,852, an improvement of 103, 254.
