



SECRETARY OF STATE
KEVIN SHELLEY
STATE OF CALIFORNIA

STAFF REPORT

**ON THE
INVESTIGATION OF
DIEBOLD ELECTION SYSTEMS, INC.**

April 20, 2004

**Presented to
Secretary of State Kevin Shelley
and the
Voting Systems and Procedures Panel**

I. BACKGROUND¹

The Diebold Election Systems, Inc. AccuVote-TSx (TSx) is the successor to Diebold's AccuVote-TS (TS) electronic voting system. The TS is still in use in some California counties. The TSx includes a number of changes from the TS, including a reduction in the weight of each direct recording electronic (DRE) device and improved accessibility for disabled voters.

Diebold Election Systems, Inc. (Diebold) is one of only four voting system manufacturers whose DRE systems are in use in the State of California. The Diebold TS system was the second DRE approved for use and first DRE used in a California election (in the City of Piedmont in 1999). Diebold is the only vendor that has two different DRE models in use, the TS and TSx. For the March 2, 2004 Statewide Primary Election (March Primary), three California counties (Alameda, Los Angeles and Plumas) utilized the TS, and four counties (San Diego, Solano, San Joaquin, and Kern) used the TSx system.

Diebold marketed, sold, and installed its TSx in these four California counties prior to full testing, prior to federal qualification, and without complying with the state certification requirements.

Before the November 3, 2003 meeting of the Voting Systems and Procedures Panel (VSPP), at which certification of the TSx system was to be considered, the Secretary of State learned of the possibility that Diebold had installed uncertified software in at least one California jurisdiction. The panel tabled its consideration of the TSx application and initiated an investigation into the actions and conduct of Diebold with regard to the installation of its software, hardware and firmware.

The VSPP revisited the tabled item when it reconvened on November 10, 2003. Prior to and during the hearing, Diebold representatives either claimed to have obtained federal qualification for the TSx system or that federal approval was imminent. Based on this assurance, and based on assertions by Diebold and its client counties that there was insufficient time to replace the TSx system for the March Primary, the VSPP *conditionally* certified the TSx system. One of the conditions issued by the VSPP was that Diebold cooperate in the Secretary of State's investigation into whether, how and why uncertified software was installed and what penalties were appropriate.

¹ The complete factual recitation related to this investigation is contained in the Findings of Fact that accompany this report.

At that same November 10th hearing, the VSPP initiated an audit of all 17 California counties using Diebold voting systems. The audit discovered that Diebold had, in fact, installed uncertified software in *all* its client counties without notifying the Secretary of State as required by law, and that the software was not federally qualified in three client counties. Diebold eventually acknowledged that it had failed to notify the Secretary of State of its proposed system modifications, and that its failure to obtain certification for those modifications violated state law.

Diebold subsequently failed to obtain federal qualification for the entire TSx system or even to pursue federal qualification of the firmware (software that is used to operate the precinct voting machines). Indeed, Diebold not only failed to obtain federal qualification for the TSx system, but failed even to pursue federal qualification of the firmware versions the VSPP authorized Diebold to install in the wake of the discovery that uncertified software had been installed.

At the VSPP's January 15, 2004 hearing, the panel requested that Diebold produce ten categories of documents to further its investigation. The request included documentation regarding the installation of the software, all federal qualification and state certification documentation of its systems, and copies of all contracts signed with California jurisdictions since January 2001. The request was formalized in a letter to Diebold's president from the VSPP Chair on January 15, 2004. In response, Diebold raised frivolous legal objections to providing many of the documents and provided other documents in an untimely manner.

Less than a month before the March Primary, after repeated assurances to the contrary, this office learned that Diebold was no longer pursuing federal ITA approval of the software and firmware installed on California voting machines. Rather, Diebold had instructed the ITA to test a newer version of both software and firmware. It also became clear that the federal ITA could not approve the newer software and firmware before the March Primary.

Shortly before the March Primary, Diebold finally obtained from the federal ITAs a very limited approval to use the TSx system installed on California voting machines, with certain "patches," on a one-time basis. Shortly before the election, Diebold engaged in a crash project to install the patches on its California voting machines.²

² In a letter dated April 14, 2004, Diebold now admits that, in its haste, it failed to install these patches on at least 34 voting machines, requiring partial recounts. (Attachment A)

It is reasonable to expect Diebold should have been cautious about proposing voting equipment -- unqualified at the federal level and uncertified at the state level – for use in an election. Yet, in addition to seeking approval of the TSx system a whole, in the last two months before the March Primary, Diebold filed with the Secretary of State’s office ten additional applications for or urging certification of various components of its voting systems. Many of these documents related either directly or indirectly to the TSx system. At least five different versions of the TSx firmware are referenced in letters between Diebold and the Secretary of State’s office (4.4.3, 4.4.3.27, 4.4.3.27-Cal, 4.4.4.10 and 4.4.5), substantially complicating efforts to certify any one version.

Virtually every application was submitted prior to the successful completion of federal testing and therefore prior to federal qualification. In its applications for state certification, even Diebold referred to the TSx versions as “pre-release” – in other words, a product that was still a work in progress. Some applications sought approval of components that would not function without installation of other components lagging even further behind in the testing and certification process. By abandoning attempts to seek federal approval of previous versions of TSx software and firmware when newer versions became available, Diebold reduced the possibility of *any* version being finally approved prior to the March Primary.

The result of Diebold’s overly-aggressive marketing of the TSx is that, more than one year after submitting the TSx to the federal ITAs, more than six months after submitting its application for state approval, more than five months after assuring the VSPP that completion of federal testing was imminent and more than four months after Diebold declared a “new day” in the way it handled compliance, not a single version of the TSx firmware has completed federal qualification testing for use in the November 2004 election.

Moreover, Diebold’s conduct has created an untenable situation for both county and state elections officials. Some county officials have felt compelled to defend untested, unqualified and uncertified Diebold voting systems, having authorized large capital outlays only to find out on the eve of or during an election that the systems do not function as promised. Before the March Primary, county officials repeatedly warned that, without certification of particular voting system components, the election could not be conducted because it was too late to devise and implement back-up plans.

The primary cause of this untenable situation was Diebold’s lack of compliance with state certification requirements, including a lack of federal qualification of its TSx system.

The risk of using voting systems that are not fully tested is epitomized by the failure of the Precinct Control Module (PCM) 500.³ These units are used to write Voter Access Cards for the ballot stations.

As with the TSx, Diebold sought certification of the PCM less than two months before the election, without having completed federal testing and with counties asserting that the election could not be conducted without PCM approval. After limited testing, the ITAs approved the units for *one time use only*, while stating a number of concerns regarding its performance.

California's independent certification and technical expert approved the PCM based on limited functional testing. Based on these reports, the Chair of the VSPP likewise granted *one-time approval* to use the PCM at the March Primary. On Election Day, the units failed on a massive scale, resulting in the potential disenfranchisement of voters.

In sum, Diebold:

1. marketed and sold the TSx system before it was fully functional, and before it was federally qualified;
2. misrepresented the status of the TSx system in federal testing in order to obtain state certification;
3. failed to obtain federal qualification of the TSx system despite assurances that it would;
4. failed even to pursue testing of the firmware installed on its TSx machines in California until only weeks before the election, choosing instead to pursue testing of newer firmware that was even further behind in the ITA testing process and that, in some cases, required the use of other software that also was not approved in California;
5. installed uncertified software on election machines in 17 counties;
6. sought last-minute certification of allegedly essential hardware, software and firmware that had not completed federal testing; and
7. in doing so, jeopardized the conduct of the March Primary.

³ This issue is addressed at greater length in the Secretary of State's staff report on the March Primary, which is also pending before the VSPP at its April 21-22 meeting.

II. DOCUMENTATION

A. Improper Installation of Uncertified Hardware, Software and Firmware

1. On August 28, 2003, Diebold Election Systems, Inc. (Diebold) sent a letter to the Secretary of State's Office seeking certification of their modified touch screen ballot station, the TSx. (Attachment B). Diebold advised that it would operate with firmware version 4.4.3 and GEMS software version 1.18.18 and asked that its request for certification be placed on the October 2003 agenda of the VSPP. At the October 9, 2003, VSPP meeting, consideration of the TSx system was postponed pending completion of state testing.
2. On October 14, 2003, Diebold sent another letter urging approval of its certification request for the TSx voting system. (Attachment C). At that time, Diebold advised the Secretary of State's Office that it had submitted its technical data package to Wyle Laboratories (which conducts testing on behalf of the federal government) in February 2003 and subsequently submitted its modified TS, the TSx, to Wyle in March 2003. (Attachment C).
3. Diebold further advised that four counties, San Diego, Kern, San Joaquin and Solano, had already purchased and Diebold had already delivered the new -TSx system. Diebold further advised that the counties needed the certification in order to use the voting systems for the March 2004 Primary Election. (Attachment C). In sum, the vendor conceded that it installed the TSx system even before submitting its application for certification.
4. On October 15, 2003, the Secretary of State's Office received Diebold's letter and application for certification of the TSx touch screen voting system. (Attachment D). The certification application states that the TSx is a modified version of their TS ballot station and that the ballot station firmware was pre-release version 4.4.3.27, as opposed to the previously noticed version 4.4.3 (Attachment D).
5. As part of the state evaluation and testing process, it came to the attention of the Secretary of State's Office on October 29, 2003 that Diebold had already installed an uncertified version of Diebold's GEMS software in one or more California counties. That software had been used in binding elections. This raised grave concerns about the company's adherence to state certification requirements. At its November 3, 2003 meeting the VSPP tabled the Diebold agenda item pending further investigation and review.

6. At its meeting on November 10, 2003, after Diebold repeatedly assured the VSPP that it would seek federal qualification of the components of its system, including the TSx firmware and the GEMS software, the VSPP voted to recommend certification to the Secretary of State with a number of conditions. Specifically, the conditions were: (1) that Diebold provide funds for an inventory of the hardware, firmware, and software in use and installed in its client counties in California; (2) that Diebold cooperate in full with independent auditors and the Secretary of State and (3) that Diebold participate in a VSPP hearing on December 16, 2003 when the panel reviews the findings of the independent audit, and of the Secretary of State's internal review. (Attachment E.)

B. AccuVote-TSx Firmware Is Not Federally Qualified

7. In the last two months before the March Primary, Diebold filed with the Secretary of State's office ten additional applications for or urging certification of various components of its voting systems. Many of these related either directly or indirectly to the TSx system. At least five different versions of the TSx firmware are referenced in letters between Diebold and the Secretary of State's office (4.4.3, 4.4.3.27, 4.4.3.27-Cal, 4.4.4.10 and 4.4.5).

8. On January 16, 2004, Diebold submitted a request for certification of system components. (Attachments F). Diebold requested permission for loading a "pre-release" version of their Ballot Station 4.4.5 software on several TSx units in each county for training purposes. (Attachment F). Diebold advised that this software version was being reviewed by a federal ITA, Wyle Laboratories, but stated that by loading a "pre-release" version, it would enable "screen shots" from the units to help prepare poll worker guides for the upcoming election, among other things. (Attachment F). With the stated goal of capturing "screen shots" for poll worker guides, the vendor clearly hoped to use this version of its software in the March election, even though it was not the version conditionally certified (4.4.3.27) and it would only operate with GEMS versions 1.18.19, which also was uncertified.

9. Due to concerns about the progress of the testing process, the Secretary of State requested, and on February 6, 2004 received, a letter from Diebold advising of its proposed plan and back-up solution for the March Primary for the four counties utilizing the TSx. In that letter Diebold advised that two federal ITAs, Wyle Laboratories and Ciber, were in the process of reviewing two potential solutions: version 4.4.3.27-Cal, a patch to version 4.4.3.27, and version 4.4.5. These components likewise had not yet received any state certification. (Attachment G).

10. On February 8, 2004, the Secretary of State's Office wrote to Diebold as a result of the concerns raised by the February 6, 2004 letter. (Attachment H). The letter

expressed concern that the TSx machines installed in four California counties had no federally qualified firmware on which to operate and that the election was only three weeks away. (Attachment H). In this letter, the Secretary noted several problems with Diebold's representation regarding federal qualification. Specifically, version 4.4.5 failed to receive federal qualification and had not passed federal functional testing. (Attachment H). Further, the current version being tested, 4.4.4.10, was in pre-release form and federal testers continued to identify problems needing to be repaired. (Attachment H). The letter further pointed out that no formal application for state testing of the new firmware had been submitted for approval. (Attachment H). Other issues were identified, including the fact that Diebold had abandoned, if not undermined efforts to obtain federal qualification of the firmware at almost the same time that Diebold represented to the VSPP that approval was imminent. (Attachment H.) The Secretary of State's Office required a detailed backup plan in order to mitigate the significant risks to the election. (Attachment H). Diebold failed to submit such a plan.

11. With only weeks before the election, on February 11, 2004, the Secretary of State issued a Notice to the County Clerk/Registrar of Voters for the Counties of Kern, San Diego, San Joaquin and Solano Counties (Attachment I), advising them that he had received reports from Wyle Laboratories and the state's certification and technical expert, stating that although the TSx voting system was not federally qualified, the system could be used for the March Primary provided specific procedures and security measures were in place. (Attachment I). The Secretary proceeded to authorize the use of Version 4.4.3.27-Cal firmware to be used in conjunction with GEMS version 1.18.18 for the March Primary only. (Attachment I).

12. Five days later, on February 16, 2004, the Voting Systems Board of the National Association of State Election Directors (NASED), wrote to the Secretary of State's Office regarding the special ITA test reports from Wyle Laboratories, Ciber, Inc., and Steven Freeman, the state's certification and technical expert, regarding the TSx using firmware release 4.4.3.27-Cal and GEMS software version 1.18.18. (Attachment J). In that letter, NASED made a *conditional* recommendation *only* in light of the urgent March Primary deadline and under the condition that the vendor address the anomalies noted in the test reports and successfully complete full ITA testing before receiving an official NASED system qualification number for the TSx. (Attachment J).

13. More than one year after submitting the TSx to the federal Independent Testing Authorities (ITAs), more than six months after submitting its application for approval, more than five months after assuring the VSPP that completion of federal testing was imminent and more than four months after the vendor told the Secretary of State's office that it had started a "new day" relating to the way it handled compliance with certification requirements (Attachment K), there is not a single version of the TSx

firmware that has completed federal qualification testing for use in the November election.

C. Even After GEMS Version 1.18.18 Was Conditionally Approved, It Needed Repeated Modifications; Diebold Also Repeatedly Pushed Counties To Adopt Version 1.18.19, Which Had Never Completed Federal Testing

14. Even before Diebold advised California counties to install GEMS version 1.18.18, which had received federal qualification, Diebold pursued certification of other versions of its software. On September 30, 2003, Conny McCormack, Registrar – Recorder/County Clerk for the County of Los Angeles, submitted a letter on behalf of the County and Diebold, requesting provisional certification of a modification to the GEMS ballot tabulation software for use in the Los Angeles County Uniform District Elections, scheduled for November 4, 2003. (Attachment L).

15. Diebold sought approval of other voting system components that were dependent on versions of GEMS other than 1.18.18. In a January 7, 2004 letter, Diebold sought review of a Key Card Tool utility software for use in the March Primary. The Key Card Tool was designed to enhance the security for ballot station hardware by allowing the user to create a smart card encoded with user-defined security codes and causing cards with different codes to be rejected. (Attachment M). The Key Card Tool, however, could only be run with GEMS 1.18.19, which was still in the federal testing process. Therefore, approval was denied.

16. Similarly, in its February 6, 2004 letter responding to the Secretary's request for a proposed backup plan for the March Primary in TSx counties, Diebold discussed the potential use of version 4.4.5 of the TSx, knowing that version only functioned with version 1.18.19 of the GEMS software.

17. Diebold had to devise a series of patches to version 1.18.18 of the GEMS software even to successfully conduct the March Primary. On February 23, 2004, the Chair of the VSPP responded to Diebold's February 16, 2004 request for conditional certification of GEMS 1.18.18.201, specifically for Alameda County, to enable that county to count its absentee and provisional ballots. (Attachment N). Based upon the information provided by the County and the state's certification and technical expert, without this equipment, Alameda County would not have been able to read approximately half of their absentee and provisional ballots due to an error on their printed ballots. (Attachment N). GEMS 1.18.18.201 was a modification to GEMS 1.18.18. Based upon the opinion of the state's certification and technical expert, GEMS 1.18.18.201 was given conditional approval for a one-time use for the March Primary in Alameda County only. (Attachment N).

18. On February 24, 2004, the Secretary of State's Office received a letter from Diebold requesting conditional certification of an "export" software utility for use in Los Angeles County for the March Primary. (Attachment O). The problem involved the InkaVote System, which did not allow for the direct import of data from other voting systems. (Attachment O). The utility was designed to export data from the TS (which was used in Los Angeles County for early voting only) in a format that could be used by the InkaVote system. On February 26, 2004, based on the recommendation of the state's testing certification and technical expert, the Secretary of State's Office granted conditional certification for the "export" software utility for use only in Los Angeles County for the March Primary. (Attachment P).

19. Even after the election was completed, the vendor was still seeking modifications. On March 19, 2004, Diebold sent another letter requesting conditional approval for GEMS 1.18.20.3, which would allow San Diego County to tabulate its provisional ballots (Attachment Q). San Diego County supported Diebold's request for conditional certification. (Attachment R). Conditional certification was not granted because an alternative was found using the existing certified software and Diebold withdrew its request. (Attachments S). San Diego, however, still requested approval. (Attachment T). The Secretary did not grant that request. (Attachment U). San Diego again insisted on receiving approval. (Attachment V). The Undersecretary again denied San Diego's request specifically advising, that there had been no review of the software, that no approval would be forthcoming, and that an alternate procedure had been found. (Attachment W).

D. Other Voting System Components

20. While not directly related to the conditional certification, Diebold's pattern of failing to seek approval or seeking late approval of components is also reflected in applications for approval it submitted for other voting system components.

21. On January 8, 2004, Diebold requested approval of two versions of the Precinct Control Module (PCM), the 100 and 500 series. (Attachment X). These units are used to write Voter Access Cards for the Diebold Election Systems ballot stations. The PCMs could be used with either the Diebold TS or the TSx voting systems. (Attachment X).

22. On February 13, 2004, the Undersecretary of State and Chair of the VSPP denied Diebold's request for conditional certification of its Precinct Control Module (PCM) 100 and 500 series voting card encoder units, based upon the fact that the units had not been federally tested. (Attachment Y). On February 20, 2004, the Undersecretary and

Chair of the VSPP received a report from the federal ITA, Ciber, indicating that testing was successful on these devices. (Attachment Z). Because it was submitted so late, testing was limited to verifying that the units functioned as described in the operator manuals. (Attachment Z). Given the concerns expressed in the report from Ciber and the concerns of the state's certification and technical expert, conditional approval for the PCM 100 and 500 series voting card encoder units was given for a one-time use for the March Primary. (Attachment Z).

23. The widespread failure of the PCM 500 in the two counties that used them reflects the potential risk to the integrity of the election whenever anyone -- a vendor or a county -- requests last-minute changes to complex voting technology systems that must be approved without full testing.

E. Audit And Conditions Of Certification

1. Audit of Diebold Client Counties

24. At the same time this office was seeking to ensure compliance with state certification requirements for the March Primary, the Secretary of State's office was also working to verify the vendor's previous record of compliance with state law. The result of that investigation showed the record to be very poor.

25. During state testing of the GEMS software version 1.18.18 that began on October 29, 2003 in McKinney, Texas, Diebold advised staff from the Secretary of State's Office that the GEMS software version 1.18.18 was installed and had been used in Alameda County for the October 7, 2003 election, even though it was not certified by the state. The next day, Diebold confirmed that GEMS software version 1.18.18 had, in fact, been used in California at the October 7, 2003 election.

26. The ensuing audit report of December 15, 2003, conducted by R & G Associates, LLC, revealed installation of unqualified and uncertified software to be far more widespread. It reported that multiple versions of the Diebold GEMS versions were installed and in use in one or more counties. It further reported that it was not certain that any of them were state certified, let alone federally qualified.

27. Diebold knew its software and firmware were not federally qualified or state certified. Diebold knew this as early as August 28, 2003, when it first submitted its letter seeking certification of the TSx, which operated with firmware version 4.4.3 and GEMS software version 1.18.18.

28. At the December 16, 2003 meeting, the VSPP ordered that Diebold be required to fully absorb the cost and to install the recently certified version of the GEMS software (1.18.18) in all of its California client counties on a timeline established between the individual counties and the Secretary of State's Office. (Attachment AA).

2. Satisfaction of Conditions of Certification

29. At that same December 16, 2003 meeting, the VSPP concluded that although Diebold had met conditions 1 and 3 of the November 10th conditional certification, documentation needed by the state's certification and technical expert had not been received from Diebold until December 11th, which resulted in the need for additional time for review. (Attachment AA). The VSPP thus concluded that condition 2 had not been fully met and therefore tabled discussion on the certification until the January 15, 2004 hearing. The VSPP additionally directed staff to continue the inventory process for the remaining 41 counties. (Attachment AA).

30. At the January 15, 2004 meeting, the VSPP requested additional documents to assist in the investigation. (Attachment BB). Included were requests for information regarding the magnitude and importance of changes indicated in the software release notes. This request was to assist the Secretary of State's Office with the evaluation of the successive versions of GEMS software installed in California counties. It was also to assist in the evaluation of the federal qualification and state certification documentation of each version of software, hardware, and firmware installed in each client county; and to obtain other information necessary for the investigation. (Attachment BB.) Documents were to be provided no later than February 15, 2004. (Attachment BB).

31. While Diebold eventually did turn over some documents requested by the VSPP, it failed to fully and timely comply with that request.

32. On March 17, 2004, a letter was sent to Diebold, identifying documents necessary for the completion of the VSPP investigation. (Attachment CC). Documents were provided in response to this request, but the Secretary of State has yet to receive confirmation from Diebold that it has fully complied in providing requested information.

33. Diebold responded very slowly to the requests by the state's certification and technical expert for release notes and other documents. Indeed, it was only during the week of April 5, 2004, more than a month after the election, and approximately three months after the documents had been requested, that the state's certification and technical expert finally received all the information he needed to complete his report.

IV. ANALYSIS

1. The Secretary of State is given general authority over voting systems by government Code Section 12172.5 and by Elections Code Sections 10, 19100 and 19200.
2. The Secretary of State is given specific authority by Section 19222 of the Elections Code to withdraw his previous approval of any voting system or part of a voting system should he determine that it be defective or prove unacceptable after conducting a periodic review. Acceptable means “worth accepting” or “satisfactory”. *Webster’s New World Dictionary and Thesaurus* (1996), p. 4. It is the conclusion of staff that many of the actions of Diebold in relation to the TSx fail to meet the minimum standards of acceptability. In particular, it is unacceptable that:
 - a. Diebold sold and installed its TSx voting system in four counties before even submitting a formal application for its certification as it admitted in its October 14, 2003 letter.
 - b. In an attempt to secure certification the vendor disingenuously assured the VSPP on November 10, 2003 that the completion of federal testing was imminent.
 - c. The vendor sought a variety of changes to the system even after it was conditionally certified. At least five different versions of the TSx firmware are referenced in letters between Diebold and the Secretary of State’s office (4.4.3, 4.4.3.27, 4.4.3.27-Cal, 4.4.4.10 and 4.4.5). These do not include changes to other voting system components other than the TSx firmware.
 - d. As noted in the February 8, 2004 letter from the Secretary of State’s office to Diebold, the vendor had abandoned, if not undermined, attempts to seek federal qualification at almost precisely the same time it assured the VSPP that approval was imminent. The vendor demonstrated a pattern of both abandoning attempts to seek federal approval of conditionally certified versions for versions lacking any certification and of abandoning attempts to seek federal approval of previous versions when newer versions became available, usually to the detriment of *any* version ever actually being finally approved.
 - e. As noted in the February 8, 2004 letter, that the vendor failed to provide sufficient back-up plans should its late applications for certification not be approved.
 - f. As noted in the February 8, 2004 letter, that Diebold’s back-up plans sometimes relied on other unqualified and uncertified software and firmware.

- g. The vendor and its client counties often warned that if newer versions other than that originally conditionally certified were not approved, the election could not be conducted.
- h. The vendor often delayed in responding to requests for additional information regarding its previous installation of unqualified and uncertified voting system components at the same time it was seeking expedited certification of new voting system components.
- i. More than one year after submitting the TSx to the federal ITAs, more than six months after submitting its application for approval, more than five months after assuring the VSPP that completion of federal testing was imminent and more than four months after the vendor told the Secretary of State's Office that it had started a "new day" relating to the way it handled compliance with certification requirements, there is not a single version of the TSx firmware that has completed federal qualification testing for use in the November 2004 General Election.

