

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF STATE

REPORT CONCERNING THE EXAMINATION RESULTS OF THE DANAHER
CONTROLS, INC. ELECTRONIC 1242 VOTING SYSTEM



Issued By:

A handwritten signature in cursive script, reading "Carol Aichele".

Carol Aichele

Secretary of the Commonwealth

September 12, 2012

I. INTRODUCTION

Article XI-A of the Pennsylvania Election Code, 25 P.S. § 3031.1 *et seq.*, authorizes the use of electronic voting systems. Section 1105-A of the Election Code, 25 P.S. § 3031.5, requires that the Secretary of the Commonwealth examine all electronic voting systems used in any election in Pennsylvania and that the Secretary make and file a report stating whether, in her opinion, the electronic voting system can be safely used by voters and meets all of the applicable requirements of the Election Code.

On September 15, 2005, Michael I. Shamos, Ph.D., J.D., a consultant retained by the Secretary¹ to conduct an examination of the Danaher Controls, Inc., ELECTronic 1242 Voting System, firmware versions 5M and 5Ma, and Guardian Election Management Software (“GEMS”), version 3.0 (hereinafter referred to as the “ELECTronic 1242 Voting System”), issued a report recommending that the Secretary certify the ELECTronic 1242 Voting System under specific conditions. On November 15, 2005, the Secretary certified the ELECTronic 1242 Voting System for use in elections in the Commonwealth and issued a report, in accordance with Section 1105-A(b) of the Election Code, 25 P.S. § 3031.5(b).²

Section 1105-A(a) of the Election Code provides that, upon payment of a reexamination fee, “[a]ny ten or more persons, being qualified registered electors of this Commonwealth, may, at any time, request the Secretary of the Commonwealth to reexamine any electronic voting system theretofore examined and approved.” 25 P.S. § 3031.5(a). By letter dated March 24, 2006, a requisite number of electors formally requested that the Secretary conduct a reexamination of the ELECTronic 1242 Voting System.³ The Pennsylvania Department of State, acting through then-Secretary of the Commonwealth Pedro A. Cortés, initially rejected the request on the basis that the reexamination was not necessary because (1) the ELECTronic 1242 Voting System had only recently been examined and approved by the Secretary, and (2) there

¹ Section 1107-A of the Election Code provides that “[n]o electronic voting system shall, upon any examination or reexamination, be approved by the Secretary of the Commonwealth, or by any examiner appointed by [her], unless it shall be established that such system, at the time of such examination or reexamination” meet specified requirements. 25 P.S. § 3031.7 (emphasis added).

² Between June 2005, when the Secretary examined the ELECTronic 1242 Voting System, and November 2005, when the ITA approved the ELECTronic 1242 Voting System, the nomenclature associated with the firmware component of the ELECTronic 1242 Voting System, but neither the performance nor functionality of the component changed; the term “5M” became “5M1.” In his November 15, 2005, report, the Secretary used the terminology employed during his examination and certified version “5M.”

³ The electors’ request concerned an earlier version of the ELECTronic 1242 Voting System (version 5M, with GEMS version 3.0), which the Secretary had certified for use by report dated November 15, 2005.

was no indication of irregularities or deficiencies that had arisen subsequent to the examination to warrant a reexamination.

Subsequent to, and partially as a result of, this decision by the Department of State, a group of Pennsylvania electors commenced suit (by means of a Petition for Review in the Commonwealth Court), claiming among other things, that the Secretary of the Commonwealth has a mandatory duty under Section 1105-A of the Election Code to conduct a reexamination when requested to do so in accordance with the statute. In overruling the Secretary's preliminary objections to the Petition for Review, the Commonwealth Court unanimously agreed. See, e.g., Banfield v. Cortés, 922 A.2d 36, 48 (Pa. Commw. Ct. 2007) (concurring and dissenting op.) ("Upon receipt of a request for reexamination, the Secretary must examine the electronic voting system.... It is up to the Secretary how to examine the electronic voting system, but examine it [she] must under the most straightforward reading of Section 1105-A(a) of the Election Code.")⁴

In July 2011, this Secretary, having only recently assumed the office, evaluated Section 1105-A of the Election Code and the duties of the Secretary of the Commonwealth to reexamine electronic voting systems when requested to do so pursuant to and consistent with the statute. Based on her evaluation of the law, including the interpretation reflected in the Commonwealth Court's Banfield opinions, the Secretary determined that she had a duty to reexamine the ELECTronic 1242 Voting System in response to the 2006 request.

Shortly after the November 15, 2005, certification of the ELECTronic 1242 Voting System, Danaher, at the behest of a Pennsylvania county, implemented two minor modifications, entirely unrelated to the ELECTronic 1242 Voting System's capability, functionality, operability or accuracy, resulting in the ELECTronic 1242 Voting System, firmware version 5M2 with GEMS, version 3.01. The examiner, Jack Cobb ("Examiner"), Laboratory Director of Pro V&V, Inc., and the Secretary have concluded that differences between version 5M/5M1/3.0 and version 5M2/3.01 are not material to the ELECTronic 1242 Voting System's ability to comply with the requirements of the Election Code.⁵ Accordingly, the examination of the functionality, capability, and compliance of version 5M2/3.01 simultaneously constitutes a reexamination of

⁴ The Banfield matter remains pending before the Commonwealth Court at No. 213 M.D. 2006.

⁵ The Change Description for Guardian 3.01 and 1242 5M2 explains that "[c]hanges were made to the Guardian software and the 1242 Firmware to accommodate customer requests to provide optional settings in the configuration setting within the Guardian Election Management Software that will enable the jurisdiction to set either a solid or blinking category light on the 1242 machine, and add an audio message after voting a write in candidate when voting with the Audio Keypad ... unit." Both the 5M1/3.0 and 5M2/3.01 versions of the ELECTronic 1242 Voting System successfully completed qualification testing to the applicable Federal Election Commission Voting System Standards, and both versions received a NASED qualification number.

the functionality, capability, and compliance of version 5M/5M1/3.0 (hereinafter collectively referred to as the "ELECTronic 1242 Voting Systems").

The Secretary appointed the Examiner as a professional consultant to conduct an examination of the ELECTronic 1242 Voting Systems pursuant to Section 1105-A(a) of the Election Code, 25 P.S. § 3031.5(a). The Examiner performed the examination on February 28, 2012, in Hearing Room 1 of the Commonwealth Keystone Building, 400 North Street, Harrisburg, Pennsylvania. Ian Harlow, Deputy Commissioner of the Department's Bureau of Commissions, Elections and Legislation, and Kathleen Kotula, Assistant Counsel for the Department, represented the Secretary of the Commonwealth. Matt Lilly, President, ELECT Inc., represented Danaher Controls Inc., ("Danaher"), the vendor of the ELECTronic 1242 Voting Systems. The examination was open to the public and was video recorded by staff members from the Department's Bureau of Commissions, Elections and Legislation. Twelve (12) members of the public attended the examination: Debbie Olivieri of Berks County; Sara May-Silfee of Monroe County; Madeline Rawley of Bucks County; Joe Lynch, John Day, and Rich Vito of Philadelphia County; Marybeth Kuznik of VotePA; Robert Fitzgerald of Buchanan, Ingersoll & Rooney PC; Michael Daly of Drinker, Biddle & Reath LLP; Mark and Mary Banfield of The Coalition for Voting Integrity (Chester County); and V. Kurt Bellman from State Representative Thomas Caltagirone's office.

II. THE ELECTRONIC 1242 VOTING SYSTEMS

The following firmware/software, hardware and peripheral components making up the ELECTronic 1242 Voting Systems were presented for examination:

- Firmware/Software
 - Guardian Election Management System ("GEMS"), version 3.01;
 - ELECTronic 1242 Firmware, version 5M2;
 - GT Audio, version 1.0.0;
 - Guardian Reports, version 4.0.0;
 - Reader USB, version 3.01;
 - Display PC, version 3.01;
 - DB Upgrade, version 3.01; and
 - Memory Cartridge Reader Programmer-USB ("MCRP-USB") Firmware, version 1.09.
- Hardware
 - ELECTronic 1242 Electronic Voting Machine ("EVM"), model 1242;
 - Memory Cartridge 5M;
 - Memory Cartridge Reader/Writer Programmer Device;
 - ADA Keypad;
 - Windows Based Computer;
 - Plotter;

- Laser Printer; and
- Head-set.
- Peripherals
 - Desktop Printer.

The following paragraphs in this section briefly describe the ELECTronic 1242 Voting Systems and are adopted in large part from Section 2.0 (“System Overview and Identification”) of the Test Report for Examination of Danaher Controls, Inc. ELECTronic 1242 Voting System, a report issued by the Examiner on September 7, 2012.

The ELECTronic 1242 Voting Systems are a full faced Direct Recording Electronic (“DRE”) voting system. The ELECTronic 1242 Voting Systems are comprised of two main components: the ELECTronic 1242 DRE Voting Machine and GEMS.

The ELECTronic 1242 voting machine is a stand-alone device that does not require direct communication at any time. The operation of the ELECTronic 1242 voting machine is controlled using a memory cartridge to download election data and results. The ELECTronic 1242 voting machine utilizes a pre-printed ballot overlay to display the ballot. Voter selections are input via push-buttons and are then recorded electronically.

GEMS is composed of the Guardian Election Management Software, GT Audio, Guardian Reports, Display PC, Guardian Reader, MCRP-USB, MCRP-Serial, memory cartridges and the ELECTronic 1242 Election voting machine. GEMS is utilized for ballot design and layout, programming election data, and accumulating vote totals for reporting. GEMS operates on a standard Windows desktop personal computer.

III. EXAMINATION PROCEDURES AND RESULTS

A. Examination Process and Procedures

To ascertain whether the ELECTronic 1242 Voting Systems can be safely used by the voters at elections in the Commonwealth and meet all the requirements of the Election Code, the Examiner developed test protocols for the examination.⁶ The test protocols separated the requirements of Article XI-A of the Pennsylvania Election Code, sections 1101-A to 1122-A, 25 P.S. §§ 3031.1 – 3031.22, into four main areas of test execution: (1) Review; (2) Targeted Functionality; (3) System Integration; and (4) Penetration Analysis.

⁶ The test protocols, as well as the time and place of the examination, were published on the website of the Department of State prior to the start of the examination on February 28, 2012.

“Review” testing consisted of analyzing ITA⁷ and other third-party reports for specific tests pertaining to the requirements of the Pennsylvania Election Code and verifying that the ELECTronic 1242 Voting Systems meet those requirements. The Examiner conducted Review testing after the February 28, 2012, examination to determine compliance with the following sections of the Election Code:

- 1105-A(a), 25 P.S. § 3031.5(a), requiring that an electronic voting system “ha[ve] been examined and approved by a federally recognized independent testing authority” and that it “meet any voting system performance and test standards established by the Federal Government;”
- 1107-A(11), 25 P.S. § 3031.7(11), requiring that an electronic voting system be “suitably designed for the purpose used, ... constructed in a neat and workmanlike manner of durable material of good quality, ... safely and efficiently useable in the conduct of elections and, with respect to the counting of ballots cast at each district, ... suitably designed and equipped to be capable of absolute accuracy, which accuracy shall be demonstrated to the Secretary of the Commonwealth;”
- 1107-A(13), 25 P.S. § 3031.7(13), requiring that an electronic voting system, “[w]hen properly operated, records correctly and computes and tabulates accurately every valid vote registered;”
- 1107-A(14), 25 P.S. § 3031.7(14), requiring that an electronic voting system be “safely transportable;” and
- 1107-A(15), 25 P.S. § 3031.7(15), requiring that an electronic voting system be “so constructed that a voter may readily learn the method of operating it.”

“Targeted Functionality” testing consisted of single-thread test cases designed to ascertain whether the ELECTronic 1242 Voting Systems comply with the requirements set forth in the following sections of the Election Code:

- 1107-A(1), 25 P.S. § 3031.7(1), requiring that an electronic voting system “[p]rovide[] for voting in absolute secrecy and prevents any person from seeing or knowing for whom any voter, except one who has received or is receiving assistance as prescribed by law, has voted or is voting;”
- 1107-A(2), 25 P.S. § 3031.7(2), requiring that an electronic voting system “[p]rovide[] facilities for voting for such candidates as may be nominated and upon such questions as may be submitted;”
- 1107-A(3), 25 P.S. § 3031.7(3), requiring that an electronic voting system “[p]ermit[] each voter, at other than primary elections, to vote a straight political party ticket by one mark or act and, by one mark or act, to vote for all the candidates of one political party for presidential electors and, by one mark or act, to vote for all the candidates of

⁷ Section 1105-A(a) of the Election Code requires that an electronic voting system be examined and approved “by a federally recognized independent testing authority,” or ITA. 25 P.S. § 3031.5(a).

one political party for every office to be voted for, and every such mark or act shall be equivalent to and shall be counted as a vote for every candidate of the political party so marked including its candidates for presidential electors, except with respect to those offices as to which the voter has registered a vote for individual candidates of the same or another political party or political body, in which case the automatic tabulating equipment shall credit the vote for that office only for the candidate individually so selected, notwithstanding the fact that the voter may not have individually voted for the full number of candidates for that office for which he was entitled to vote;”

- 1107-A(4), 25 P.S. § 3031.7(4), requiring that an electronic voting system “[p]ermit[] each voter, at other than primary elections, to vote a ticket selected from the nominees of any and all political parties, from the nominees of any and all political bodies, and from any persons whose names are not in nomination and do not appear upon the official ballot;”
- 1107-A(5), 25 P.S. § 3031.7(5), requiring that an electronic voting system “[p]ermit[] each voter to vote for any person and any office for whom and for which he is lawfully entitled to vote, whether or not the name of such person appears upon the ballot as a candidate for nomination or election;”
- 1107-A(7), 25 P.S. § 3031.7(7), requiring that an electronic voting system, “[i]f it is of a type that registers the vote electronically, ... preclude each voter from voting for more persons for any office than he is entitled to vote for or upon any question more than once;”
- 1107-A(10), 25 P.S. § 3031.7(10), requiring, in pertinent part, that an electronic voting system, “[i]f it is of a type that registers the vote electronically, ... permit each voter to change his vote for any candidate or upon any question appearing on the official ballot up to the time that he takes the final step to register his vote and to have his vote computed;”⁸ and
- 1107-A(16), 25 P.S. § 3031.7(16), requiring that the “district component of the automatic tabulating equipment” of an electronic voting system that provides for the “computation and tabulation of votes at the district level” include (a) a “visible” public counter that “shall show during any period of operation the total number of ballots entered for computation and tabulation;” (b) lock(s) that “absolutely” prevent “all operation of the tabulation element of the automatic tabulating equipment ... after the polls are closed or where the tabulation of votes is completed;” (c) construction or control capabilities “that, during the progress of voting, ... preclude every person from seeing or knowing the number of votes theretofore registered for any candidate

⁸ Section 1107-A(10) of the Election Code distinguishes between electronic voting systems that register votes electronically, like the ELECTronic 1242 Voting Systems, and those that “use paper ballots or ballot cards to register votes.” 25 P.S. § 3031.7(10). For the latter, the Election Code requires that “the system shall provide that a voter who spoils his ballot may obtain another ballot; any ballot thus returned shall be immediately cancelled and at the close of the polls shall be enclosed in an envelope marked ‘Spoiled’ which shall be sealed and returned to the county board.” 25 P.S. § 3031.7(10).

or question; and ... preclude every person from tampering with the tabulating element;" (d) a mechanism or capability that rejects overvotes but, "if used during the period of voting, it may also have the capacity to indicate to a voter that he has improperly voted for more candidates for any office than he is entitled to vote for, and in such case it shall have the capacity to permit the voter to mark a new ballot or to forego his opportunity to make such correction;" and (e) an "element which generates a printed record at the beginning of its operation which verifies that the tabulating elements for each candidate position and each question and the public counter are all set to zero and with an element which generates a printed record at the finish of its operation of the total number of voters whose ballots have been tabulated, the total number of votes cast for each candidate whose name appears on the ballot, and the total number of votes cast for, or against, any question appearing on the ballot."

"System Integration" testing sought to ascertain whether the ELECTronic 1242 Voting Systems meet all of the requirements of the Pennsylvania Election Code that can be met by the execution of an entire election. The Examiner created two election definitions, a general election and a closed primary election, to test and measure specific input devices, voting patterns, and results. Pre-voting reports were generated, consisting of a ballot proof report, precinct summary report, and election summary report. The polls were opened and precinct tabulator zero proof reports were generated. The Examiner, staff members from the Bureau of Commissions, Elections and Legislation, and employees from the Bureau of Management Information Systems and other bureaus within the Department of State, input a complex voting pattern consisting of distinct combinations of vote selection, as documented in the test protocols. The polls were closed and results reports were generated, including cast vote records and ballot images. The voted data was then transferred to the election management system ("EMS"), and election summary reports, precinct summary reports, and ballot images were printed. At the conclusion of the test, the Examiner conducted a statistical recount of at least 10% of the votes cast by comparing the documented voting pattern with the cast vote records and ballot images. The procedures identified each ballot by the distinct voting pattern that was input. The Examiner also generated a backup of the EMS database and retained a copy with the other test data.

System Integration testing tested proprietary hardware, firmware/software and peripherals, as well as commercial, off-the-shelf materials configured as a precinct- or district-count system. While System Integration testing addressed many of the requirements of the Election Code that were also the subject of Targeted Functionality testing, System Integration testing was designed to test compliance with the following additional sections:

- 1101-A, 25 P.S. § 3031.1, defining "electronic voting system" to mean "a system in which one or more voting devices are used to permit the registering or recording of votes and in which such votes are computed and tabulated by automatic tabulating equipment. The system shall provide for a permanent physical record of each vote cast;"

- 1107-A(4), 25 P.S. § 3031.7(4), requiring that an electronic voting system “[p]ermit[] each voter, at other than primary elections, to vote a ticket selected from the nominees of any and all political parties, from the nominees of any and all political bodies, and from any persons whose names are not in nomination and do not appear upon the official ballot;”
- 1107-A(6), 25 P.S. § 3031.7(6), requiring that an electronic voting system “[p]ermit[] each voter to vote for as many persons for any office as he is entitled to vote for and to vote for or against any question upon which he is entitled to vote and precludes each voter from voting or from having his vote tabulated for any candidate, or upon any question, for whom or upon which he is not entitled to vote;”
- 1107-A(8), 25 P.S. § 3031.7(8), requiring that an electronic voting system “[p]reclude[] each voter from voting or from having his vote tabulated more than once for any candidate for the same office or upon any question, except in districts and for offices where cumulative voting is authorized by law;”
- 1107-A(9), 25 P.S. § 3031.7(9), requiring that an electronic voting system “[p]ermit[] each voter at a primary election to vote only for the candidates seeking nomination by a political party in which such voter is registered and enrolled, and for any candidate for nonpartisan nomination, and for any question upon which he is entitled to vote;” and
- 1117-A, 25 P.S. § 3031.17, requiring that a “county board of elections, as part of the computation and canvass of returns, shall conduct a statistical recount of a random sample of ballots after each election using manual, mechanical or electronic devices of a type different than those used for the specific election. The sample shall include at least two (2) per centum of the votes cast or two thousand (2,000) votes whichever is the lesser.”

“Penetration Analysis” testing sought to ascertain whether the ELECTronic 1242 Voting Systems meet the requirement of Section 1107-A(12) of the Election Code, which requires that an electronic voting system “provides acceptable ballot security procedures and impoundment of ballots to prevent tampering with or substitution of any ballots or ballot cards.” 25 P.S. § 3031.7(12).

Precinct tabulation devices were configured as if for delivery to a polling place from a warehouse; this included all suggested seals and locks. The Examiner inspected the device for the ability to tamper with the transportation case and the device inside the case. The inspection examined the ports, the outer case, and memory devices from the aspect of the device as delivered to the polling place and configured for voting. The Examiner also examined both the precinct device and the EMS for password management of administrative functions and ensured the system counter cannot be reset by unauthorized persons. The Examiner photographed the configuration and analyzed the configuration for possible vulnerabilities.

B. Examination Specifications

In accordance with the test protocols, the examination of the ELECTronic 1242 Voting Systems occurred in an environmentally controlled room, which was selected primarily because it was large enough to hold the voting system, the participants, and the public. The room was configured such that the Examiner, the representatives of the Secretary of the Commonwealth, and Danaher each had their own independent work areas. Members of the public were allowed to observe the examination.⁹

SLI Global Solutions, a trusted source, provided the Department's Bureau of Commissions, Elections and Legislation with a trusted build of the ELECTronic 1242 Voting Systems prior to the date of the examination. On the day of the examination, Danaher provided three ELECTronic 1242 precinct tabulation devices, the EMS with the test election definitions, and the components necessary to load the trusted build onto the precinct tabulation devices. The Examiner provided Danaher with the firmware/software that had been provided by the trusted source. Danaher then loaded the firmware/software onto the required media and installed the firmware/software on each of the precinct tabulation devices. Once the firmware/software was loaded onto the precinct tabulation devices, Danaher was not allowed access to the internal components of the devices without consent of the Examiner or a representative of the Secretary of the Commonwealth.

C. Examination Results

On September 7, 2012, the Examiner issued the test report for the ELECTronic 1242 Voting Systems.

1. Review Testing Results

The Review testing performed by the Examiner demonstrates that the ELECTronic 1242 Voting Systems meet the relevant requirements of the Pennsylvania Election Code.

Specifically, the ITA reports and certifications submitted by Danaher satisfy the requirements of Section 1105-A(a) of the Election Code, 25 P.S. § 3031.5(a); the ELECTronic 1242 Voting Systems have been examined and approved by an ITA as meeting the applicable performance and test standards established by the federal government.

The design requirements of Sections 1107-A(11) and (14) of the Election Code, 25 P.S. §§ 3031.7(11) & (14), are met by the documented Product Safety Test in the submitted ITA

⁹ The Secretary published the time and place of the examination on the Department of State website prior to the date of the examination. Additionally, the Department sent a letter to the primary contact for the group of electors who requested the reexamination notifying them of the time and place of the examination.

reports, which the Examiner deemed acceptable. Additionally, the accuracy requirements of Sections 1107-A(11) and (13), 25 P.S. §§ 3031.7(11) & (13), are met by the documented Accuracy Test in the submitted ITA reports, which the Examiner found to be acceptable.

Section 1107-A(14) of the Election Code, 25 P.S. § 3031.7(14), is further met by the combination of Hardware Non-Operating Environmental Tests performed by the ITA, which included: bench handling, vibration, low temperature, high temperature, and humidity. These components tests were designed to test the storage of precinct tabulation devices between elections, as well as transportation between the storage facility and the polling place.

2. Targeted Functionality Testing Results

The protocols relating to Targeted Functionality testing developed and published prior to the examination consisted of nine (9) separate tests. The Examiner conducted each of these tests during the examination with necessary modifications, as indicated below (see Part III.D). No issues or material anomalies were experienced during these tests, and the objective criteria established in the test protocols were met.

Specifically, the examination of the ELECTronic 1242 Voting Systems demonstrates that, if set up pursuant to item four (4) of the Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on April 28, 2009, the ELECTronic 1242 Voting Systems provide the requisite voter secrecy in compliance with Section 1107-A(1) of the Election Code, 25 P.S. § 3031.7(1). Additionally, the ELECTronic 1242 Voting Systems successfully record and report:

- votes for “1 of 1,” “N of M,” and “Question” contests for both a standard voting session and an ADA voting session in compliance with Section 1107-A(2), 25 P.S. § 3031.7(2);
- straight party votes and demonstrated the “Pennsylvania Method” of straight party voting for both a standard voting session and an ADA voting session, meeting the requirements of Section 1107-A(3), 25 P.S. § 3031.7(3); and
- straight party and write-in votes for both a standard voting session and an ADA voting session, meeting the requirements of Sections 1107-A(4) & (5), 25 P.S. §§ 3031.7(4) & (5).

The ELECTronic 1242 Voting Systems also successfully prohibit a voter from selecting more than the number of allowable selections, including write-in votes, for both a standard voting session and an ADA voting session, in compliance with Section 1107-A(7), 25 P.S. § 3031.7(7). The ELECTronic 1242 Voting Systems provide a voter with a review screen and allows a voter to return to either the beginning of the ballot or an individual contest to make changes to his or her selection(s) before casting the ballot for both a standard voting session and

an ADA voting session, meeting the requirements of Section 1107-A(10), 25 P.S. § 3031.7(10). Lastly, the ELECTronic 1242 Voting Systems provide a public counter that increments with each cast vote; provide the ability to be locked after the polls are closed; preclude the re-opening of the polls after they are closed; possess design features that allow tamper evident locks and seals to be placed on the voting devices; and provide a zero proof and results report, as required under Section 1107-A(16), 25 P.S. § 3031.7(16).

3. System Integration Testing Results

The ELECTronic 1242 Voting Systems successfully completed both the general and closed primary elections. The Examiner experienced no issues or material anomalies during these tests, and the ELECTronic 1242 Voting Systems met the objective criteria set forth in the test protocols. Accordingly, the ELECTronic 1242 Voting Systems meet the requirements of Sections 1101-A and 1117-A of the Pennsylvania Election Code, 25 P.S. §§ 3031.1 & 3031.17, in that the systems are able to provide for a permanent physical record in the format of the cast vote record and ballot images that can be used to conduct a statistical recount. The System Integration testing further confirmed that the ELECTronic 1242 Voting Systems comply with Section 1107-A(4), 25 P.S. § 3031.7(4), in that the systems successfully allowed voters in a general election to vote for candidates from all parties and political bodies, including write-in candidates. The ELECTronic 1242 Voting Systems comply with Section 1107-A(9), 25 P.S. § 3031.7(9), in that test voters in the primary election were only able to vote for candidates seeking nomination from for their party and the systems rejected attempts to vote for candidates seeking nomination from the other party. The ELECTronic 1242 Voting Systems meet the requirements for Sections 1107-A(6) and (8), 25 P.S. §§ 3031.7(6) & (8), in that the test voters cast votes on different ballot styles for candidates and questions and the ELECTronic 1242 Voting Systems precluded test voters from over voting.

4. Penetration Analysis Results

During the performance of this analysis, the ELECTronic 1242 Voting Systems provided acceptable ballot security procedures and impoundment of ballots to prevent tampering with or substitution of any ballots or ballot cards. The systems also provided acceptable password management and restriction of access to administrative functions. Therefore, the ELECTronic 1242 Voting Systems meet the requirements of Section 1107-A(12) of the Election Code, 25 P.S. § 3031.7(12).

D. Observations

1. Review Testing Observations

As a result of the Review testing, the Examiner concluded that the ELECTronic 1242 Voting Systems comply with the requirements of the relevant sections of the Pennsylvania Election Code.

The Examiner noted that Danaher did not provide a Summative Usability Report, related to the requirements set forth in Section 1107-A(15) of the Election Code, 25 P.S. § 3031.7(15). The Examiner nevertheless concluded that the ELECTronic 1242 Voting Systems comply with this requirement. The Examiner did not encounter any issues performing the method of operation for standard voting sessions or ADA voting sessions during execution of the examination. Additionally, Department of State staff members were used to input voting data for the System Integration testing, and no operational issues were reported. The Secretary accepts this conclusion.

2. Targeted Functionality Testing Observations

As a result of the Targeted Functionality testing, the Examiner concluded that the ELECTronic 1242 Voting Systems comply with the requirements of the relevant sections of the Pennsylvania Election Code.

The Examiner noted that the observer reported being able to see parts of the ballot and voter inputs while executing the ADA test case for Section 1107-A(1) of the Election Code, 25 P.S. § 3031.7(1), which requires an electronic voting system to provide for voting in secrecy. The Examiner noted, however, that he tested the ELECTronic 1242 Voting Systems while activated for a standard voting session and that the display is not active in an actual ADA voting session. The Examiner concluded that the ELECTronic 1242 Voting Systems, if set up pursuant to item four (4) of the Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on April 28, 2009, provide the requisite voter secrecy so that an observer is unable to see whom a voter voted for, in compliance with the Pennsylvania Election Code.

The Examiner noted an unexpected result in the ELECTronic 1242 Voting Systems' execution of the "Pennsylvania Method" in a "preference vote" scenario (*i.e.*, where a voter, having made a straight-party selection, seeks to vote for only one candidate of that party in a race for an office that allows for multiple selections). When selecting the preferred candidate, all candidates that had been selected by the straight-party vote already made for that race, including the preferred candidate, were deselected. The Examiner had to make another affirmative selection of the preferred candidate to record the vote. The Examiner had expected that the first selection of the preferred candidate would deselect the other candidates for that race, but would not deselect the preferred candidate. The Examiner noted that the ELECTronic 1242 Voting Systems' performance, while unanticipated, did not affect the ability of the system to accurately record, report, or store votes.

The Secretary observes that the Pennsylvania Method of straight-party voting, as set forth in Section 1107-A(3) of the Election Code, 25 P.S. § 3031.7(3), does not require that a selection of a preferred candidate in a multi-candidate race deselect all other selections while retaining the selection of the preferred candidate. The purpose of the Pennsylvania Method is to ensure that a

voting system credit only votes that an elector has individually selected; that is, the Election Code requires that voters make affirmative selections for a candidate or candidates for that vote to be recorded and reported. The ELECTronic 1242 Voting Systems meet that requirement.

3. System Integration Testing Observations

The Examiner did not observe any issues or anomalies during the execution of the System Integration testing. As noted above, as a result of this testing, the Examiner concluded that the ELECTronic 1242 Voting Systems comply with the requirements of the relevant sections of the Pennsylvania Election Code.

4. Penetration Analysis Observations

The Examiner did not observe any issues or anomalies during the execution of the Penetration Analysis testing. As noted above, as a result of this testing, the Examiner concluded that the ELECTronic 1242 Voting Systems comply with the requirements of the relevant sections of the Pennsylvania Election Code.

IV. CONDITIONS FOR CERTIFICATION

Given the results of the February 28, 2012, examination and the findings of the Examiner as set forth in his September 7, 2012, report, the Secretary of the Commonwealth certifies the ELECTronic 1242 Voting Systems in accordance with the conditions detailed in the report dated November 15, 2005, and the following additional condition:

- Pennsylvania counties using the ELECTronic 1242 Voting Systems must comply with the Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on April 28, 2009, and in particular adhere to item four (4) of the directive when setting up and positioning the precinct tabulation devices in the polling place to assure compliance with the constitutional and statutory requirements that secrecy in voting be preserved (see Pa. Const. Art. VII. § 4; and Section 1107-A(1) of the Election Code, 25 P.S. § 3031.7(1)).

V. RECOMMENDATIONS

The Secretary of the Commonwealth reaffirms the recommendations in the Secretary's certification report dated November 15, 2005.

VI. CONCLUSION

As a result of the examination conducted on February 28, 2012, and after consultation with the Department's staff and the Examiner, the Secretary of the Commonwealth concludes that the ELECTronic 1242 Voting Systems can be safely used by voters at elections as provided in the Pennsylvania Election Code and meet all of the requirements set forth in the Code,

provided the voting systems are implemented with the conditions listed in Section IV of this report, as well as all conditions listed in the November 15, 2005, report. Accordingly, the Secretary reaffirms certification of the ELECTronic 1242 Voting System, version 5M1/3.0 and continues to approve the ELECTronic 1242 Voting System, version 5M1/3.0 for use in this Commonwealth. The Secretary also certifies and approves the ELECTronic 1242 Voting System, version 5M2/3.01, for use in this Commonwealth.

In addition, pursuant to the Directive on Electronic Voting Systems issued by the Secretary of the Commonwealth on August 8, 2006, the Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Boards of Elections issued on April 28, 2009, and Section 1105-A(d) of the Pennsylvania Election Code, 25 P.S. § 3031.5(d), these certifications and approvals are valid only for the voting systems discussed in this Report. If the vendor or a County Board of Elections makes **any** changes to the ELECTronic 1242 Voting Systems subsequent to the date of its examination, it must **immediately** notify the Pennsylvania Department of State and the relevant federal testing authority or laboratory. Failure to do so may result in the decertification of the ELECTronic 1242 Voting Systems in the Commonwealth of Pennsylvania.

All jurisdictions that have implemented the ELECTronic 1242 Voting System, version 5M1/3.0 pursuant to the certification of November 15, 2005, or that will implement either the ELECTronic 1242 Voting System, version 5M1/3.0 or 5M2/3.01, under this certification must comply with the directives found in this Report, previous reports for the ELECTronic 1242 Voting System, and any directives issued by the Secretary of the Commonwealth regarding the use of this System, in accordance with Section 1105-A(a)-(b) of the Election Code, 25 P.S. § 3031.5(a)-(b).

The ELECTronic 1242 Voting Systems can be expected to accommodate at least 350 voters per election.