COMMONWEALTH OF PENNSYLVANIA
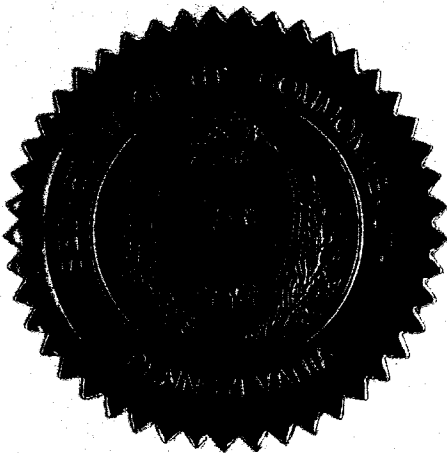
DEPARTMENT OF STATE

REEXAMINATION RESULTS OF
UNILECT CORPORATION'S
PATRIOT DIRECT RECORDING SYSTEM

Issued by:

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Secretary of the Commonwealth
April 7, 2005

REEXAMINATION OF UNILECT CORPORATION
PATRIOT DIRECT RECORDING SYSTEM
A REPORT BY THE SECRETARY
OF THE COMMONWEALTH OF PENNSYLVANIA

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 all electronic voting systems to be examined and approved by the Secretary of the Commonwealth before use in any election in Pennsylvania. This section also provides for the reexamination of previously certified systems at the request of ten or more registered electors.

Upon the request of nineteen (19) registered electors from Beaver County, and the required $450.00 reexamination fee received in the Department of State's Bureau of Commissions, Elections, and Legislation, the Department contacted the UniLect Corporation and scheduled a reexamination of the Patriot Direct Recording System (hereinafter referred to as "System") for Tuesday, February 15, 2005.

Dr. Michael I. Shamos, Ph.D., J.D. was retained by the Secretary of the Commonwealth as an expert to conduct this electronic voting system reexamination. Albert Masland, Chief Counsel; Monna Accurti, Commissioner of the Bureau of Commissions, Elections & Legislation; Jonathan Marks, Chief of the Division of Elections; and Patrick Williams, Help America Vote Act Specialist, represented the Secretary of the Commonwealth. Also attending the reexamination were invited members of the public, press and Mercer County Commissioner Michele Brooks.

II.   THE PATRIOT DIRECT RECORDING SYSTEM

The System is a direct recording electronic system with a liquid crystal display (LCD). It does not require the use of paper ballots or punch cards. The following paragraphs in this section briefly describe the functions of the System as summarized by the vendor.

The ballot is displayed on the LCD touch screen, usually on multiple pages. The voter can select the appropriate screen by touching the appropriate page box on the screen, and select their chosen candidate by touching the candidate's box on the screen illuminating the candidate's name while an "X" appears next to his name. The selected candidate's name remains illuminated until the voter selects another page, or deselects the candidate's name by touching the candidate's box again. The voter may write in a candidate's name by touching the write-in box and spelling the name out on the keyboard that appears on the screen.

After the voter has completed voting, a review screen appears listing all of the candidates selected by the voter for each office. The voter can then change a selection(s), or cast his or her vote.

Using a personal computer, election information can be programmed and stored on an "infopack" which is inserted into a "precinct control unit" (PCU), sealed and sent to the polling place. Each infopack will only work with the PCU specified during programming for an election.

At the polling place, district election officials break a seal and open the poll. At that time, the system generates a report to show that each candidate has zero votes prior to allowing individuals to vote.

At the appropriate time, district election officials break another seal to close the poll. Multiple copies of a totals report are printed that contain cumulative results for each candidate, and the infopack is taken to a central location designated by the county where the totals from that precinct are combined with the others.

III. EXAMINATION PROCEDURES AND RESULTS

The reexamination was conducted to test for the statutory requirements specified in section 1107-A of the Election Code (25 P.S. § 3031.7). The vendor demonstrated the setup, voting, close of polls, and election night tabulation features of the System. The expert asked questions of the vendor and requested demonstrations of various features before conducting the Pennsylvania Standardized Test. The Test is a set of 12-ballots designed to ensure the electronic voting system's compliance with the Election Code.

Although the System tabulated all ballots correctly during the Test, based on the results of the reexamination, including the answers to questions provided by the vendor and the advice provided by the Department's contracted expert, the Department has several concerns about the System. The following are the major concerns with respect to compliance with the Election Code:

Reliability, Safety, & Efficiency

During the reexamination it was observed that the System failed to sense touches on multiple occasions, and on one instance the screen "froze" and stopped accepting any touches. Because the screen does not reliably detect the voters' finger touches, the System will fail to register their votes. These problems could have resulted in the high undervote rates in the counties that used the System in the 2004 General Election. The Independent Election Committee assembled by the Mercer County Commissioners found that the undervote rates of the three counties that used the System during the General Election were significantly higher than those of counties that used other systems in Pennsylvania (see Appendix A from the Report of the Mercer County Independent Election Committee).

Therefore, the System is not "safely and efficiently useable in the conduct of elections" nor is it "suitably designed and equipped to be capable of absolute accuracy", as required by section 1107-A(11) of the Election Code (25 P.S. § 3031.7(11)). The failure to recognize voter choices also violates section 1107-A(13) of the Election Code (25 P.S. § 3031.7(13)), which requires accurate tabulation of votes cast.

Further, the System exhibits several behaviors that do not allow the voter to "readily learn the method of operating it." These behaviors include confusing choices presented to the voter on the touchscreen, on the write-in screen, on the "Touch here to begin voting" screen, and displaying messages whose import is misleading or unclear. Thus, the System violates section 1107-A(15) of the Election Code (25 P.S. § 3031.7(15)).

System Security

The security of voting systems has become an increasing concern with the availability to the public of technology that is capable of manipulation and intrusion. The lack of a contemporaneous log printer renders the System susceptible to an intruder conducting unauthorized activities but then concealing his actions by redacting the log files. Specifically, it was discovered during the reexamination that an intruder could conduct malicious activities on the personal computer at the central location (usually kept at the county election office) and then erase any evidence that such activity had taken place because its electronic log is an unencrypted text file. Additionally, the electronic log only

records events initiated through the System software, and therefore does not record any functions initiated through a Windows operating system interface, such as copying or deleting. This adversely impacts auditability of the System which draws into question its ability to meet the requirements of sections 1107-A(11) & (13) of the Election Code (25 P.S. § 3031.7(11) & (13)). Being susceptible to an intruder also violates the security requirements of section 1107-A(12) of the Election Code (25 P.S. § 3031.7(12)).

In addition, an optional code exists to allow the PCU to omit the step of printing a zero tape at the opening of polls. This is in violation of section 1107-A(16)(v) of the Election Code (25 P.S. § 3031.7(16)(v)), which requires "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."

Other Concerns

In addition to the concerns set forth above, the expert found the following deficiencies during the reexamination:

1. The straight party deselect function was found by the expert to be both "inconsistent and confusing." For example, if a voter would attempt to deselect or change a straight party choice such action could cause the entire ballot to be changed. In short, this function is implemented in a fashion that violates section 1107-A(3) of the Election Code (25 P.S. § 3031.7(3)), requiring that votes be counted for any "candidate individually so selected."

2. The System contains a method of permitting the transfer of unofficial vote totals by a telephone modem. Such a transfer of vote totals by modem is not authorized in Pennsylvania. This feature of the System would need to be removed from units used in this state.

IV. CONCLUSION

For the reasons listed in Section III of this report, resulting from the reexamination conducted on February 15, 2005, and after consultation with the Department's staff and expert, the certification granted to the UniLect Patriot Direct Recording System for use in elections in the Commonwealth of Pennsylvania is hereby revoked by the Secretary of the Commonwealth in accordance with section 1105-A(c) of the Election Code (25 P.S. § 3031.5(c)).

Appendix A

County:	Ballots Cast	Pres. Ballots Cast	Residual Vote	% Residual Vote	Undervote	% Undervote	Voting Method
Adams	42,360	42,250	110	0.26%	110	0.26%	Opscan
Franklin	59320	58,790	530	0.89%	171	0.28%	Opscan
Somerset	36,875	36,778	198	0.54%	120	0.33%	Opscan
Lehigh	145,651	145,091	560	0.38%	560	0.38%	Lever
Clearfield	34,408	34,109	299	0.87%	155	0.45%	Opscan
Wayne	20,396	18,914	1482	7.27%	105	0.51%	Lever
Huntingdon	18,319	18,055	250	1.36%	102	0.56%	Opscan
Juniata	10,190	10,044	146	1.43%	59	0.58%	Opscan
Berks	165,694	164,699	995	0.60%	995	0.60%	DRE (Danaher)
Jefferson	19,541	N/A	N/A	N/A	131	0.67%	Opscan
Bedford	22,907	22,907	214	0.69%	159	0.69%	Opscan
Cameron	2,451	2,431	20	0.69%	17	0.69%	Opscan
Centre	65,013	64,384	628	0.97%	467	0.72%	Punch Card
Washington	95,497	94,307	1190	1.27%	781	0.82%	Punch Card
Indiana	36,910	36,499	411	1.11%	329	0.89%	Opscan
Columbia	27,015	26,753	262	0.97%	262	0.97%	Opscan
Sullivan	3,289	3,241	48	1.46%	41	1.25%	Opscan
Tioga	17,869	17,608	261	1.46%	261	1.48%	Opscan
Blair	54,635	53,746	889	1.63%	889	1.63%	Punch Card
Cambria	68,071	66,656	1,415	2.08%	1,414	2.08%	Punch Card
Venango	23,946	23,259	432	1.80%	354	2.87%	Punch Card
Greene	16, 307	15, 565	742	4.50%	742	4.50%	DRE (Unilect)
Beaver	86, 609	82, 058	4, 551	5.25%	4551	5.25%	DRE (Unilect)
Mercer	55,621	51,564	4,057	7.29%	4,057	7.29%	DRE (Unilect)
						1.49%	

Average Undervote for 24 Counties: 1.49%

Data assembled by Prof. Michael Coulter, Grove City College