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CERTIFICATION OF AN OPTICAL SCAN ELECTRONIC VOTE TALLYING SYSTEM

In March of 2005 Election Systems & Software, Inc. (ES&S) of Omaha, Nebraska requested the review and examination of enhancements to a Washington State certified optical scan/mark sense central count ballot card reader system.

Upon examination of the system, the Secretary of State finds the Unity system satisfies the requirements of Washington State law. This version of the system, NASED N-1-02-22-22-003 (2002), consists of:

- **Hardware,** comprised of
  - ES&S Model 650, Central Scanner, v. 2.0.1.0, an upgrade of the previously certified version 1.1.9.1
  - ES&S Model 100, Precinct Tabulator, v. 5.1.0.0, an upgrade of the previously certified version 4.5.5

- **Software,** comprised of
  - ES&S Unity System 2.5, upgraded from v.1.0
    - Audit Manager, v.7.3.0.0
    - Election Data Manager, v.7.3.0.0
    - ES&S Image Manager, v.7.3.0.0
    - Hardware Programming Manager, v.5.1.0.0
    - Data Acquistion Manager, v.6.0.0.0
    - Election Reporting Manager, v.7.0.0.0

Under the provisions of RCW 29A.12.020 and 29A.12.030, the Secretary of State hereby approves the ES&S Unity system for use in Washington State as an optical scan electronic vote tallying system, when used in compliance with the procedures contained in this certification, the accompanying Report and Findings, and Washington State law.

Certified on this June 28, 2005

SAM REED
Secretary of State

FINAL REPORT OF THE SECRETARY OF STATE ON THE EXAMINATION AND EVALUATION OF AN OPTICAL SCAN ELECTRONIC VOTE TALLYING SYSTEM

In March of 2005 Election Systems & Software, Inc. (ES&S) of Omaha, Nebraska requested the review and examination of enhancements to a Washington State certified optical scan/mark sense central count ballot card reader system under RCW 29A.12.020 and 29A.12.030. The hardware and software for this system is marketed under the name ES&S Model 100 Precinct Ballot Counter firmware version 5.1.0.0, which is an upgrade of the previously certified version 4.5.5 and ES&S Model 650 Central Scanner firmware release 2.0.1.0, an upgrade of the previously certified version 1.1.9.1. The Software that integrates the hardware components of the system is called Unity Election System version 2.5. The system was fully certified under the 2002 standards by the National Association of State Election Directors (NASED N-1-02-22-22-003).

The Model 100 is a poll-site based, hand fed, optical scan/mark sense ballot card reader. The reader interprets marked ballots and records vote totals onto a credit card sized SRAM memory card. The machine can support the use of memory cards ranging in capacity from 128k to 512k bytes. The Model 100 unit can produce individual precinct reports on-site. The Memory card contains a rechargeable battery that allows storage of vote totals without being plugged into the Model 100. Any Model 100 machine can be used to read any memory card and produce reports.

A PCMCIA reader installed in a personal computer (PC) running UNITY is used to download and program the memory cards. This same reader is also used as the PC's receiver for accumulation of results and report generation. Printers may be attached to the PC for result printing and continuous log printing and/or external printers may be attached to the Model 100 via an RS-232 port. Results and logs may be printed either way using a standard Epson compatible printer driver. The log may also be printed by the Model 100 reader's on-board printer. Each Model 100 can be outfitted with an internal PCMCIA modem or connected via serial port to an external modem for reporting results telephonically to the Unity system.

The Model 100 reader may be mounted on a ballot box. The ballot box has internal moving parts that include a ballot path diverter that directs ballots into two different bins. One bin contains ballots that have been scanned and counted that are considered complete. The other bin is intended for ballots that have write-in votes on them. All offices on ballots deposited in the write-in bin are tallied with the exception of the office with the write-in vote. The ballot box is important to the most effective operation of the Model 100. This ballot box should always be used with the system.

The ES&S model 650 is a tabletop optical ballot scanner designed to be used as a central ballot counting system. The machine has an attached printer that can produce a variety of reports. The machine usually is programmed by the manufacturer through the use of removable zip

disk. The user sends a description of the election to the vendor, who programs an EPROM chip and sends it to the user for installation and testing. Alternately, the user may burn the EPROM directly using an EPROM burner attached to a PC running the 'Hardware Programming Manager' module of the Unity Election system.

The UNITY software is menu driven and allows the user to describe all aspects of an election. In preparation for ballot counting, the user enters office descriptions, positions, precinct combinations, ballot types, and any statistical information such as registered voter totals. The UNITY software is used to produce and download the precinct specific programming onto the Model 100 memory card and/or the Model 650 zip disk

A personal computer running the Unity Election System "Data Acquisition Manager" serves as the central accumulator for county wide results. UNITY can accumulate results via reading the Model 100 SRAM memory card or through telephonic communication with the Model 100. The Model 650 stores ballot totals on a zip disk which is in turn uploaded to the cumulative tallying database by inserting the disk in the PC running the Unity Election System. The zip disk is also used to restore totals from this reader in order to count additional ballots and produce updated totals.

An electronic vote tallying system must meet the following requirements (as set forth in WAC 434-335-040) in order to be approved for use in Washington State:

1. Secures to the voter secrecy in the act of voting;
2. Permits the voter to vote for any person for any office and upon any measure that he or she has the right to vote for;
3. Permits the voter to vote for all the candidates of one party or in part for the candidates of one or more other parties;
4. Correctly registers all votes cast for any and all persons and for or against any and all measures;
5. Except for functions or capabilities unique to this state, has been tested and approved by the appropriate independent testing authority approved by the United States election assistance commission.
6. Correctly counts votes on ballots on which the proper number of votes have been marked for any office or issue;
7. Ignores votes marked for any office or issue where more than the allowable number of votes have been marked, but correctly counts the properly voted portions of the ballot;
8. Accumulates a count of the specific number of ballots tallied for each precinct, total votes by candidate for each office, and total votes for and against each ballot measure on the ballot in that precinct; and
9. Produces precinct and cumulative totals in printed form.
10. Be capable of being secured with lock and seal when not in use;
11. Be secured physically and electronically against unauthorized access;
12. Not be connected to, or operated on, any electronic network including, but not limited to, internal office networks, the internet, or the world wide web. A network may be used as an internal, integral part of the vote tabulating system but that network must not be connected to any other network, the internet, or the world wide web; and

13. Not use wireless communications in any way.
14. A remote tabulating system must be able to create a disk, paper tape, or other physical record of ballot results prior to a telephonic transmission of results.

Testing and evaluation of Election Systems & Software's Unity Election System with the Model 100 and Model 650 was conducted by Secretary of State staff, June 7th, 2005 in the Secretary of State's office at 520 Union in Olympia, WA. Examining the system for the Office of the Secretary of State were Paul Miller, Elections Information Manager and Lori Guerrero, HAVA Coordinator. Also participating in the examination were members of the Thurston County Elections staff, and representatives from ES&S. The vendor made a presentation of the Unity Election system and test elections were conducted using groups of test decks prepared at the direction of the Office of the Secretary of State and other ballots prepared by the examiners.

The Voting Systems Review Panel conducted a public hearing of Election Systems & Software's Unity 2.5 Election System with the Model 100 and Model 650, June 10th, 2005 in the Secretary of State's office at 520 Union in Olympia, WA. Present from the Panel were Debbie Cook, Disability and Technology Alliance, Patrick Pow, Director of Information Technology, University of Washington-Tacoma, Michael Rooney, Pierce County Elections Staff, and Bob Terwilliger, Snohomish County Auditor. Representing the Office of the Secretary of State was Paul Miller, Elections Information Manager. Also participating in the hearing were members of the public, and representatives from ES&S. Paul Miller presented the findings from staff testing, and the vendor made a presentation of the Unity Election system, and responded to questions and findings. Hearing participants also had the opportunity to use the systems extensively.

FINDINGS OF THE SECRETARY OF STATE

The Unity software system, the M100, and M650 have been successfully used in several different configurations in different counties throughout the state of Washington since 2001, as well as widely throughout the nation. The system and its components' reliability and accuracy have not been brought into question. Some errors have been made by election administrators posting election results from the tabulation devices to the cumulative database in Unity. These errors have been discovered and corrected during the canvassing process.

A persistent problem in this state with this system has been receiving the election specific programming from ES&S in a timely manner to conduct the pre-election Logic and Accuracy test. ES&S provides counties with the option to have their company provide the election specific programming. Given the tight statutory timelines in this state, this process has often resulted in getting the programming very late. Consideration should be given to requiring procedures with this and future certifications to ensure that the delivery of election specific programming can accomplished within the statutory timelines.

ES&S informally requested the system be evaluated for use as an extension to the manual inspection process. They proposed permanently disabling the ability to print election result reports directly from the M650 in order to allow ballots to be scanned and sorted prior to election day. After attempting to evaluate the change in the M650 configuration, staff believes ES&S agrees with the Secretary of State that this approach also disables crucial aspects of the M650 functionality. ES&S has proposed another alternate approach which will be evaluated when ES&S makes the necessary equipment available to the Secretary of State.

Staff finds that the system does not support the "pick-a-party" consolidated ballot option as incorporated by the legislature in 2004 into the "Montana-style" primary. The system does support the multiple ballot option of the same legislation. As partisan ballots are not a feature of the primary system passed by the people in Initiative 872, November 2004, this is not a impediment to certification. However, the system must recertified by the Secretary of State if the "pick-a-party" consolidated ballot option is reinstated before a county may use the "pick-a-party" consolidated ballot option.

A voter who uses an incorrect marking tool to mark the ballot can create a problem. The equipment will not read a range of red ink. Inspection should be performed on each ballot to insure that black ink, or an ink or pencil that provides high contrast with the ballot color, was used by the voter in marking the ballot.

Additionally, the vote tallying equipment only scans the ovals next to the candidate name looking for votes. If a voter marks the ballot in a manner inconsistent with the function of the machine (for example, they mark the ballot by circling candidate names), the machine will fail to record an otherwise valid vote. A visual inspection of each ballot looking for odd marks will solve this problem.

After an evaluation of the system as upgraded and a review of the accompanying documentation, staff believes the system and its components continue to meet current Washington State requirements as outlined in WAC 434-335-040. The documentation accompanying the application for certification shows the system with upgrades was fully reviewed by federally approved independent testing authorities prior to receiving NASED certification. The Unity 2.5 system with the M100 and M650 is certified for use in Kentucky and Michigan.

SECRETARY OF STATE STAFF RECOMMENDATION

Staff recommends the ES&S Unity 2.5 System, the M100 (firmware version 5.1.0.0) precinct tabulator, and the M650 tabulator (firmware release 2.0.1.0) be certified for use in Washington state, provided that the following procedures are used in conjunction with the system:

The design of the Model 100 and Model 650 readers, and the requirements of Washington State law, necessitates the use of one of special procedures on the part of the user county to assure proper tallying and results.

The procedures are as follows:

1) The system may be used as a central counting system if each ballot is manually inspected before tabulation. The inspection should look for improperly marked ballots, and ballots marked with non-standard marking colors. It is recommended that the canvassing board of any county using this system adopt written procedures governing this process;

2) The system may be used as a poll site tabulation device if the device is set to reject blank-voted ballots and over-voted ballots. Blank-voted ballots are ballots where the device is unable to read any votes cast for any of the contests on the ballot. An over-voted ballot is one where the device registers more votes cast in one or more contest(s) than are valid for that contest. The voter must be given the opportunity to correct the ballot before the ballot is counted. It is recommended that the canvassing board of any county using this system adopt written procedures governing this process; or

A county intending to use the telephonic functions of the ES&S Model 100 system must perform a reconciliation of the results prior to certification. This may be accomplished by either performing a direct reading of the SRAM card into the PC, or by proofing the precinct results recorded in UNITY against the printout created by the Model 100 at the close of voting before telephonic transmission.

The memory card and zip disk must be treated with the same accountability and security practices that are employed with un-voted and voted paper ballots.

Staff strongly recommends the user county create their own election specific programming through the modules provided in Unity 2.5. If the user county elects to continue to have ES&S provide the election specific programming, the user county or its designee must use ES&S on-line Unity system to create the election specific programming. These procedures are necessary to allow sufficient time to adequately test the election specific programming prior to elections.

It is recommended that the canvassing board of any county using this system adopt written procedures governing these processes. This equipment should be used with a device or devices capable of suppressing current surges, voltage fluctuations, and any other line disturbances.

VOTING SYSTEMS REVIEW PANEL RECOMMENDATION

By consensus, the Voting Systems Review Panel adopts the staff recommendation of Secretary of State staff that the ES&S Unity 2.5 System, the M100 (firmware version 5.1.0.0) precinct tabulator, and the M650 tabulator (firmware release 2.0.1.0) be certified for use in Washington state, along with the staff recommended procedures.

In addtion, the Voting Systems Review Panel adds the following procedures and restrictions to the use of this system:

The user county must ensure that instructions are printed on the paper ballots that clearly state that "No Red Ink" is to be used and clearly illustrate how to properly mark a ballot.

The system may not be used to support a "pick-a-party" consolidated ballot partisan primary as enacted by the legislature in 2004. The system as evaluated under this certification does not support a primary where the system must invalidate all partisan choices on a primary ballot when the voter has either:

a. Not indicated a party preference, or;
b. Voted for a candidate of a party in any partisan contest other than the party chosen in the party preference.

The Model 650, as evaluated under this certification, may not be used to support the visual inspection of absentee ballots. Absentee ballots may not be scanned and/or tabulated by the Model 650 until Election Day.