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Ann McGeehan
Director of Elections
Secretary of State
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Re: Election System & Software ("ES&S")-Unity Election System v 2.4.3 consisting of the following changes; the Ballot Definition and Layout-Hardware Programming Manager v5.0.3.0c; Election Day Software-Data Acquisition Manager (DAM) v5.03.1b and Election Reporting Manager v6.4.3.0a; Tabulators-iVotronic v8.0.1.0r, PEB v1.07 and Model 150/550 Central Count v 2.1.1.0a; Data Acquisition Manager-Modem Manager v5.0.2.1a, DAM Client Reader v 5.03.0a and DAM Client Sender v5.02.1a (collectively "Revised Voting Systems").

Dear Ms. McGeehan:

Pursuant to my appointment as an examiner under *Chapt. 122, Texas Election Code*, I examined the above referenced software and hardware as presented by ES&S for examination. I examined the Revised Voting Systems with respect to Texas Election Law and procedure on May 26, 2004. All of the equipment and software collectively referenced above as the Revised Voting Systems, are increments of the Unity election System v2.4.3. And, these essentially may be separated into modifications made to the Ballot Definition and Layout function, the Election Day tabulation and reporting functions, the listed tabulation and ballot scanning devices, and the election day data acquisition and report function.

This report is concerned solely with the ability of the Revised Voting Systems, and each individual listed module thereof, to function individually and with other certified components of ES&S's Unity Election System in compliance with Texas Election Law. This report is based on the presentation by ES&S and the testing completed by the examiners on May 26, 2004. ES&S gave a well organized presentation, and the casting, tabulation and reporting of votes, together with the remainder of the examination, did not evidence any function that was not in compliance with *Chapt. 122, Subchapt. A, Texas Election Code*, for use in an election, except as specifically noted below. However, no opinion is expressed

regarding the suitability of the Election System for the purposes of or use by any jurisdiction.

The Unity Election System v. 2.4.3 functions with all of the ES&S product line referenced above, and the other previously certified ES&S programs and equipment. In that respect, the testing of the Revised Voting Systems was divided roughly into two parts. One part, or grouping, consisted of the tabulation equipment, i.e. the iVotronic v8.0.1.0r, PEB v1.07 and the Model 150/550 Central Count v 2.1.1.0a. The functions of the Ballot Definition and Layout-Hardware Programming Manager v5.0.3.0c are also particularly important with respect to the function of the tabulation devices. The second grouping was election central and the central count and reporting of the election results from the tabulation devices. The Election Day Software-Data Acquisition Manager (DAM) v5.03.1b, the Election Reporting Manager v6.4.3.0a, the Data Acquisition Manager-Modem Manager v5.0.2.1a, the DAM Client Reader v 5.03.0a and the DAM Client Sender v5.02.1a are all essential parts of the counting and reporting of votes on election day .

Group One - Tabulation

The examiners voted a number of ballots to be read and processed separately through the iVotronic and the Model 150/55. The results from each were separately verified, and then all were transported to election central for a central count combined tabulation and election report. Except as noted specifically below, the examination and testing evidenced that the machines and devices included in Group One, operating with Unity Election System v. 2.4.3 and functioning with election central, operated in compliance with *Chapt. 122, Texas Election Code*.

Observations. The issues noted by this examiner, with respect to the above equipment, are all applicable to the 150/550. (1) The Model 150/550 does not require being cleared, or zero cut, before beginning to tabulate ballots. (2) The "bleed thru" issue appears to have been resolved by off-setting the back of the two sided ballot. (3) The changes to the 150/550 appear to result in "less" sensitivity to ballot markings, with some variation from one ballot read to another as to the ballot selection marks that are read or not read.

Discussion. My comments regarding the above three items are as follows. (1) The software for the Model 150/550 should be modified to automatically zero out at the start-up of each election tabulation. This same issue tracks back to the need to require the precinct level voting stations/PEBs to clear and automatically "zero out" all prior votes, etc. when the election is started-up on election day. The requirement that all votes in the PEBs and

tabulated on the Model 150/550 upon opening the election, or the start of tabulation as applicable, should be automatic. (2) The bleed thru issue remains problematic, although it appears to be resolvable by proper off-set printing of the back side of double faced ballots. Given the potential impacts on an election and prospects for printer error in providing sufficient off-set, it would appear that also requiring use of a more appropriate marking device should be considered. (3) However, the "Bic" ballpoint pens provided by the vendor for marking some of the ballots do not appear satisfactory. These pens did not always make a consistent dark mark even when firm pressure was applied in making the marks. And, absent dark markings, even when the entire oval was covered on each ballot race, the 150/550 did not read all voter markings.

It appeared the sensitivity or read method on the Model 150/550 may have been modified, possibility to assist with the "bleed thru" issue, and that such may result in a much larger number of ballots being rejected by the tabulation device and having to be read by hand. On one ballot, the Bic pen was used to mark and fill the complete oval for one selection on each race. The Bic markings were made by not pressing down hard, as with some elderly voters, but the complete oval was covered. The ballot was rejected, more markings were made on all the ovals, the ballot was again rejected, more markings were made, etc. for a total of four attempts to tabulate the ballot. It is noted that since such ballots are rejected and then inspected by an election official, the votes are not lost, and the election is not ultimately impacted. Rather the efficiency of the election may be disrupted. It simply appears that, unless pressed down firmly when marking, the Bic pens are not the optimum device and may be a problem for elderly voters and the election officials.

Recommendations. The tabulation of votes by the iVotronic and the Model 150/550 appeared to meet the certification requirements of the Texas Election Code. However, as presented, close and careful application of vendor requirements and operating procedures are required with respect to ballot preparation and marking devices. I recommend the vendor strongly consider providing for an automatic "zero out" function to occur at the start of the election, for the precinct level voting stations, i.e. the PEBs, the iVotronic and the Model 150/550. I also recommend the vendor obtain and specify more adequate marking devices for use by voters to mark ballots.

Group Two - Election Central

Election central and central count includes the functions of acquisition of the tabulated ballots from the precincts into election totals, and reporting those election results. The DAM v5.03.1b, the Election Reporting Manager v6.4.3.0a, the DAM Modem

Manager v5.0.2.1a, the DAM Client Reader v 5.03.0a and the DAM Client Sender v5.02.1a were included in this portion of the examination, operating with Unity Election System v. 2.4.3, functioning with prior certified programs as election central, appeared to operate in compliance with *Chapt. 122, Tex. Elec. Code.*

Observations. Election central, including the function of the modem transfer of vote results from regional sites, appeared to aggregate, tabulate, compile and present election results in compliance with the Texas Election Code. Based on prior decisions, the election system records and provides sufficient information to meet the Election Code requirements for auditing the election. However, the audit trail content for the Revised Voting System can be materially improved. My comments regarding the audit trail and recording of pertinent information are as follows: (1) no precinct machine number is recorded on the electronic or paper log when tabulated votes are forwarded to election central by modem; (2) although available, the PEB number is not required to be reported on the election central log; (3) when the election reporting manager ("ERM") or real-time audit log printer is turned off, precincts can continue to be reported via modem, although DAM prints such items from its internal log when ERM or the log printer is turned back on; and (4) if a regional site logs on to report via modem, a second (bogus) site can also log on and attempt to report at the same time, without material attention when either ERM or the log printer is turned off.

Discussion. The regional sites are all assigned identification numbers, each PEB and precinct also has an identification number, both of these and the configuration of the election and data map have to be the same for a regional site to report via modem. These identification numbers should be included on the real-time audit log. (Based on the real-time audit log, I suspect not but am not aware whether or not they are recorded in the electronic log.)

Election central should also not be able to receive downloads of vote tabulations via modem or any other method, when the real-time log printer is not functioning. Prior examinations have evidenced opportunities to wrongfully manipulate election results in ways often unexpected. If such action is intentional, the audit log can be equally limited if it is not fully operational at all times. In addition, if ERM or the audit log has been turned off for an extended period of time, when turned back on and the intervening information is then printed, material information, e.g. a bogus reporting site download, can be obscured by the volume of data recorded and printed. I am personally convinced of the value of the real-time audit log, based on discoveries made in prior examinations. And, this vendor has had years in which to come into full compliance with the requirements for a real-time audit log.

Ann McGeehan
Director of Elections
Secretary of State
ES&S Election Systems

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Recommendation. Audit Log Printer. The Unity Election System at election central has a functioning audit log printer. However, some functions on the audit log printer are still not recorded on a real-time basis. For example, one observed failure to record real-time was that if the election system is exited or closed the audit log does not record that action until the next time when the election program is started up or accessed. This vendor has had several years in which to remedy this matter. I recommend the Secretary decline to certify Data Acquisition Manager (DAM) v5.03.1 or Unity Election System v 2.4.3 until the real-time audit log printer functions in full compliance with the Texas Election Code.

Summary Recommendations for Secretary Action

Although a more satisfactory marking pen should be obtained and specified, it appears adequate procedures can be followed to assure compliance with the election code in the operation and use of the iVotronic v8.0.1.0r, PEB v1.07 and the Model 150/550 Central Count v 2.1.1.0a, and I recommend these versions be certified by the Secretary as meeting the requirements of *Chapt. 122, Subchapt. A, Texas Election Code.*

The DAM Modem Manager v5.0.2.1a, the DAM Client Reader v 5.03.0a and the DAM Client Sender v5.02.1a, and Election Reporting Manager v6.4.3.0a, appear to meet the requirements of the election code, and I recommend these versions be certified as meeting the requirements of *Chapt. 122, Subchapt. A, Texas Election Code.*

However, although the ES&S Unity Election System is a good election system, it still does not comply with respect to the real-time audit log requirement after years of notice. For improved security, a more transparent, auditable election, and to require a real-time audit log that complies with the Texas Election Code, I recommend DAM v5.03.1b and Unity Election System v 2.4.3 not be certified until such time as the real-time audit log printer fully complies with the Texas Election Code.

Sincerely,



Barney L. Knight