January 11, 2007

State of New Jersey
Office of the Attorney General
Department of Law and Public Safety
P. O. Box 080
25 Market Street
Trenton, New Jersey 08625-0080

Attention: Ms. Donna Kelly, DAG

Re: Sequoia Voting Systems, Inc. – Voter Verified Paper Record System

Dear Ms. Kelly:

Sequoia Voting Systems, Inc. ("Sequoia") submits this letter pursuant to the report from NJIT dated December 22, 2007 regarding the testing of the Advantage model D-10 with VVPAT (VVPRS). Enclosed are Sequoia's comments addressing the one "exception" raised in the Report.

Respectfully submitted,

SEQUOIA VOTING SYSTEMS, INC.

By:_____
     Edwin B. Smith, III
     Vice President, Compliance/
     Quality/Certification

VVPRS for Sequoia Advantage Voting Units:

Exception:
III.A.3 *"The printer shall be secured by security seals or locking mechanisms to prevent tampering. The printer shall be accessed only by those election officials authorized by the county commissioner of registration."*
V.E. *"The printer shall be connected to the voting machine either by completely concealing the printer connection or via a security tag to prevent tampering."*
Parts of the printer data cable and printer power cord, about 3ft long from the printer to the back door of DRE, are still exposed without any protection.

Sequoia takes exception to the word "still" to describe this purported issue, as it is not listed as an exception in the initial Advantage testing report. The cable is shielded by a flexible conduit. That being said, Sequoia will provide a more robust shielding over the cable for the next retesting effort.

Concerns:
IV.A.2.b *"If the corresponding electronic record contains a digital signature, the digital signature shall be included in the barcode on the paper record."*
• *The DRE does generate an individual digital signature for each electronic ballot image record of an accepted paper record, and it is calculated based on vote selections kept in a proprietary form, proprietary syntaxes, and a corresponding CRC-8 (cyclic redundancy check) value, by using the SHA-256 algorithm.*
• *The VVPRS does generate an individual digital signature for each barcode printed on a paper record. This digital signature is calculated based on the contents of the paper record, including the switch position IDs for each voted candidate and write-in names for each contest, and proprietary syntaxes, by using the SHA-256 algorithm.*
• *Requirement IV.A.2.b seems to imply that both digital signatures shall be the same. Our testing reveals that they are two different digital signatures, one based on the electronic ballot image record, and the other based on the paper record.*

Sequoia asserts that this does in no manner violate the letter or spirit of the VVPRS regulations. In fact, moving from the SHA-1 algorthm, as utilized in the version first tested by NJIT in the summer of 2007, to the more robust SHA-256 algorthm of today's version is an improvement to the manner of authenticating (signing) the vote records.

IV.A.2.c *"The barcode shall not contain any information other than an accurate reflection of the paper record's human-readable content, error correcting codes, and digital signature information."*
• *According to the updated vendor documentation, 2.5 AVC Advantage D10 Data Dictionary Oct2007 v1-06, page 32, the VVPRS does generate an individual digital signature for each barcode printed on an accepted paper record, by using the SHA-1 algorithm.*
• *Our observation indicates that the VVPRS does generate an individual digital signature for each barcode printed on an accepted paper record, by using the SHA-256 algorithm rather than the SHA-1 algorithm.*

This is an item simply requiring the documentation to be updated. Apparently, the notation regarding the SHA-x algorithm used was missed. Sequoia will ensure the documentation is updated to reference only the SHA-256 algorithm, as it is the algorithm in actual use.

During the pre-LAT mode, not the official election mode, during two attempts of the simulated 1200-vote test, after about 300 votes, paper records in the storage

bag caused a blockage at the outlet of the VVPRS, resulting in paper jams and then a termination of these tests. The paper records in the storage bag had to be removed.

Sequoia will update the pollworker documentation to better describe methods for preventing this sort of paper jam. We note that this issue was not mentioned in the first test effort by NJIT on the Advantage. The ballot bag design was not changed for this second test effort.

Subsequently, during the pre-LAT mode, not the official election mode, while attempting the simulated 1200-vote test, after 945 votes the paper record was printed, but not cut and dropped into the storage bag. The printer advanced (i.e., rolled out) the remaining paper roll. The DRE detected the error and displayed a message "VVPAT Printer Error. Service Required." on the official panel. The test had to be terminated by powering down the voting machine to bring it back to workable status. This is probably attributed to a faulty printer. After replacing the printer, the 1200-vote test was successfully completed.

NJIT is correct, the printer suffered shipping damage and required replacement. In an election cycle, this issue would have been discovered during equipment preparation and Logic and Accuracy Testing and thus would not have caused any negative effect to the voters.