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TEST REPORT

**CERTIFICATION TESTING AND EVALUATION
 OF THE
 SEQUOIA AVC ADVANTAGE D-10 DRE VOTING SYSTEM
 WITH AVC ADVANTAGE D-10 DRE VOTING MACHINE,
 AUDIO VOTING ACCESSORY AND
 APS VERIVOTE PRINTER**

FOR

**SEQUOIA VOTING SYSTEMS
 717 17th STREET, SUITE 310
 DENVER, CO 80202**

(sd)

STATE OF ALABAMA }
 COUNTY OF MADISON }

James E. Feller, NCT, Senior Engineer, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted testing and is to the best of his knowledge true and correct in all respects.

SUBSCRIBED and sworn to before me this 6th day of May 20 08

Sandra A. Daniel
 Notary Public in and for the State of Alabama at Large

My Commission expires June 5, 2008

Wyle shall have no liability for damages of any kind to person or property, including special or consequential damages, resulting from Wyle's providing the services covered by this report.

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1.0 INTRODUCTION

1.1 Scope

This report presents the test results for Certification Testing of the Sequoia AVC Advantage D-10 Direct Record Electronic (DRE) Voting System, including AVC Advantage D-10 DRE Voting Machine, Audio Voting Accessory, and APS Verivote Printer. The specimens tested were received at Wyle Laboratories on October 15, 2007 and subjected to an inspection upon receipt. The receiving inspection revealed the test specimens to be in good condition. Testing was performed at Wyle Laboratories' Huntsville, Alabama, Test Facility from October 15, 2007, through April 30, 2008.

The primary purpose of the testing effort is to demonstrate that the Advantage D-10 DRE Voting System meets or exceeds the requirements set forth in the FEC 2002 Voting System Standards.

1.2 Objective

The objective of this test program was to ensure that the AVC Advantage D-10 DRE Voting System comprised of the Sequoia AVC Advantage D-10 DRE Voting Machine, Audio Voting Accessory, and APS Verivote Printer complied with the applicable hardware and software requirements of the FEC 2002 Voting System Standards described in this report. A change release to the AVC Advantage firmware was implemented to ensure incorporation of functionality required by the FEC 2002 Voting System Standards. Review of source code and follow-up regression testing was required to ensure continued compliance with the requirements of the Federal Election Commission (FEC) Voting System Standards, April 2002, under which it was originally qualified.

The scope and detail of the requirements for certification have been tailored to the design and complexity of the software submitted by Sequoia Voting Systems for testing. The certification test procedure is intended to discover defects in software design and system operation which, should they occur in actual election use, could result in failure to complete election operations in a satisfactory manner.

The tests have been designed to evaluate system compliance with the requirements of the VVSG. The examination will include selective in-depth examination of software, the inspection and evaluation of system documentation and optional tests verifying system performance and function under normal and abnormal conditions.

Due to the varying requirements of individual jurisdictions, it is recommended by the Voting Systems Standards that local jurisdictions perform pre-election logic and accuracy tests on all systems prior to their use in an election within their jurisdiction.

1.3. Test Report Overview

This test report consists of six main sections and attachments:

- 1.0 Introduction – Provides the architecture of the Test Report – Includes a list of documentation, customer information, and references applicable to the voting system hardware, software, and this test report.
- 2.0 Test Background – Provides a brief overview of the testing scope of the Test Report and list of terms and abbreviations.
- 3.0 System Identification – Offers information about the Sequoia AVC Advantage D-10 DRE voting System.

1.0 INTRODUCTION (continued)

1.3 Test Report Overview (continued)

- 4.0 System Overview – Describes the hardware and software and testing performed.
- 5.0 Test Specifications – Provides a summary of the functional testing process.
- 6.0 Test Results and Recommendation – Provides a summary of the results of the testing process.
- Attachments– Information supporting reviews and testing of the voting system are included as attachments to this report

1.4 Documentation

Table 1-1 lists the documents included as part of this Test Report. Documents designated by Sequoia Voting Systems to be delivered to customers are indicated by an *.

Table 1-1 Documentation List

Document Name	Part No.	Version	Date
AVC Advantage D-10 Change Specification	096050022	1.02	April 2008
AVC Advantage D-10 Technical Data Package	096050122	1.03	April 2008
AVC Advantage D-10 System Overview	096050082	1.05	April 2008
AVC Advantage D-10 Functional Specification	096050042	1.06	April 2008
AVC Advantage D-10 Software Technical Specification	096050012	1.05	April 2008
AVC Advantage D-10 Data Dictionary	096050032	1.07	April 2008
AVC Advantage D-10 Penetration Analysis	096051802	1.03	April 2008
AVC Advantage D-10 Validation Test Plan	096050092	1.07	April 2008
AVC Advantage D-10 Security Overview	096050072	1.04	April 2008
AVC Advantage D-10 Operators Manual*	096050062	1.07	April 2008
AVC Advantage D-10 Poll Worker Guide*	096050112	1.04	April 2008
AVC Advantage D-10 Maintenance Manual*	096050052	1.06	April 2008
AVC Advantage D-10 Personnel & Training Requirements	096050002	1.03	April 2008
AVC Advantage D-10 Configuration Management Plan	096051501	1.03	April 2008
AVC Advantage D-10 Quality Assurance Program	096051402	1.03	April 2008
Advantage D-10 Audio Accessory Poll Worker/ Operator Manual*	096116603	1.02	April 2008
AVC Advantage D-10 VVPAT Operators Manual*	50000097	1.07	April 2008
*WinEDS System Operations Procedures Release 4.0	50000005	1.00	January 2008

1.5 Customer

SEQUOIA VOTING SYSTEMS
717 17TH STREET, SUITE 310
DENVER, CO 80202

1.0 INTRODUCTION (continued)

1.6 References

- Sequoia Voting Systems' Purchase Order No. P0001101
- Wyle Laboratories' Quotation No. 545/044154/DB
- Federal Election Commission 2002 Voting System Standards
- Wyle Laboratories' Test Report No. 51884-12, "Hardware Qualification Testing of the Sequoia AVC Advantage D-10 DRE Voting Machine (Firmware Version 10.3.11)", dated July 26, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.3 from 10.4.2, dated Thursday, June 28, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.4 from 10.4.3, dated Tuesday, July 17, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.5 from 10.4.4, dated Tuesday, September 18, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.6 from 10.4.5, dated Tuesday, October 9, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.7 from 10.4.6, dated Tuesday, October 25, 2007
- Sequoia Voting Systems Advantage Change Release Summary – I/O Driver, Version 10.4.9 from 10.4.7, dated 14 February, 2008
- Sequoia Voting Systems Advantage System Change Notes – I/O Board, Version 10.5.0 from 10.4.9, dated 21 February, 2008
- Sequoia Voting Systems Advantage System Change Notes – I/O Board, Version 10.5.1 from 10.5.0, dated 22 February, 2008
- Sequoia Voting Systems Advantage System Change Notes – I/O Board, Version 10.5.2 from 10.5.1, dated 26 March, 2008
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.6 from 10.4.5, dated Friday, June 29, 2007
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.8 from 10.4.7, dated Thursday, October 4, 2007
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.9 from 10.4.8, dated Tuesday, October 16, 2007
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.13 from 10.4.9, dated Thursday, October 25, 2007
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.16 from 10.4.13, dated Monday, October 29, 2007
- Sequoia Voting Systems Advantage Change Release Summary – Main Application, Version 10.4.18 from 10.4.16, dated Tuesday, October 30, 2007
- Sequoia Voting Systems Advantage System Change Notes – Main Board, Version 10.4.22 replaces 10.4.18, dated February 14, 2008

1.0 INTRODUCTION (continued)

References (continued)

- Sequoia Voting Systems Advantage System Change Notes – Main Board, Version 10.5.0 replaces 10.4.22, dated February 21, 2008
- Sequoia Voting Systems Advantage System Change Notes – Main Board, Version 10.5.1 replaces 10.5.0, dated February 24, 2008
- Sequoia Voting Systems Advantage System Change Notes – Main Board, Version 10.5.2 replaces 10.5.1, dated February 29, 2008
- Wyle Laboratories' Quality Assurance Program Manual, Revision 2
- MIL-STD-45662A, "Calibration System Requirements"
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- UL Standard for Safety for Information Technology Equipment, UL 60950-1, Second Edition dated March 27, 2007

2.0 TEST BACKGROUND

Wyle Laboratories was founded 57 years ago as the first independent testing laboratory for systems and components under harsh environments, including dynamic and climatic extremes. Wyle Laboratories became involved with the testing of electronic voting systems in the early 1990's.

2.1 General Information about the Test Process

Certification testing on the AVC Advantage D-10 DRE Voting System, including AVC Advantage D-10 DRE Voting Machine, Audio Voting Accessory, and APS Verivote Printer, was performed at the Wyle Laboratories Huntsville, AL test facility.

2.2 Testing Scope

This report presents the test results for Hardware and Software Certification Testing of the AVC Advantage D-10 DRE Voting System, including AVC Advantage D-10 Voting Machine (Firmware Version 10.5.2), Audio Voting Accessory, and APS Verivote Printer. Functional tests were performed to verify source specific changes associated with AVC Advantage Change Release 10.5.2. This was done to ensure proper implementation of the changes made to the AVC Advantage D-10 DRE Voting System firmware between version 10.3.11 (the previously qualified version) and the current version release of 10.5.2.

The scope and detail of the requirements for certification testing have been tailored to the design and complexity of the hardware and software submitted by Sequoia Voting Systems for testing. The tests performed are intended to discover defects in hardware and software design and system operation which, if they occurred during an actual election, could negatively impact election operations.

2.0 TEST BACKGROUND (continued)

2.2 Testing Scope (continued)

The tests have been designed to evaluate system compliance with the requirements of the FEC 2002 Voting System Standards. The tests will include selective, in-depth examination of hardware and software; the inspection and evaluation of system documentation; and optional testing to verify system performance and function under normal and abnormal conditions.

The results contained in this report are valid only for the items listed in Section 3 of this report. Any changes, revisions, or corrections made to the product after this evaluation shall be reevaluated, and a revised report shall be issued.

Additionally, testing on optional components that are not mentioned in this report is out of the scope of the program.

2.3 Testing Objective

The objective of this test program was to ensure that the Sequoia AVC Advantage D-10 DRE Voting System, Firmware Version 10.5.2, complied with the requirements the FEC 2002 Voting System Standards.

The primary purpose of Certification Testing is to demonstrate compliance with levels of design, performance, and quality claimed by manufacturers. The tests are also intended to demonstrate that the system meets or exceeds the requirements to which it is being tested.

2.4 Wyle Quality Assurance

All work performed on this program was in accordance with Wyle Laboratories' Quality Assurance Program and Wyle Laboratories' Quality Program Manual, which conforms to the applicable portions of International Standard Organization (ISO) Guide 17025.

The Wyle Laboratories, Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

Wyle Laboratories is accredited (Certificate No. 845.01) by the American Association for Laboratory Accreditation (A2LA), and the results documented in this test report have been determined in accordance with Wyle's scope of accreditation unless otherwise stated in the report.

2.5 Test Equipment and Instrumentation

All instrumentation, measuring, and test equipment used in the performance of this test program was calibrated in accordance with Wyle Laboratories' Quality Assurance Program which complies with the requirements of ANSI/NCSL Z540-1, ISO 10012-1, and ISO/IEC 17025. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

2.0 TEST BACKGROUND (continued)

2.6 Terms and Abbreviations

- COTS – Commercial Off The Shelf
- DRE – Direct Recording Electronic
- FEC – Federal Election Commission
- TDP – Technical Data Package, the documentation provided by the vendor
- VSS – 2002 Voting System Standards issued by the FEC
- VSTL – Voting System Test Laboratory
- SVS – Sequoia Voting Systems

3.0 SYSTEM IDENTIFICATION

The system submitted by Sequoia Voting Systems for certification testing consisted of the hardware, firmware, and software source code components listed in Tables 3-1 and 3-2.

3.1 Hardware

**Table 3-1 Sequoia AVC Advantage D-10 DRE Voting System
Hardware Components**

Component	Identification	Description
Advantage DRE (Vertical Configuration)	Model: D-10, Hardware Rev. F S/N: 23713, 23419, 20391, 21853	Direct Recording Equipment (DRE) full face voting machine designed to read and tabulate ballots at the polling place.
Advantage DRE (Horizontal Configuration)	Model: D-10, Hardware Rev. F S/N: 33411, 20380	Direct Recording Equipment (DRE) full face voting machine designed to read and tabulate ballots at the polling place.
APS Verivote Printer	P/N: AXSQ81007 S/N: AP790006, AP790017, AP790009, AP790010, AP790004	Thermal-type side-mounted printer which attaches to the right side privacy panel via slide rails located on the door. It includes a ballot bag for storage of printed receipts.
Audio Voting Accessory 5.1	P/N: 460-32690-00, Rev. D	Optional Audio Voting Accessory used for audio voting with the AVC Advantage voting machine.
Seiko Report Printer	Type: DPU-414-30B S/N: 3013105B, 3061231B & 3006609B	Printer used to provide election reports.

3.0 SYSTEM IDENTIFICATION (continued)

3.2 Firmware

**Table 3-2 Sequoia AVC Edge 5.1 DRE Voting System
Firmware Versions**

Component	Firmware Version
Advantage DRE Voting Machine	10.5.2
APS Verivote Printer	(COTS)
Audio Voting Accessory	8.6
Seiko Report Printer	(COTS)

3.3 Test Support Hardware and Materials

Sequoia Voting Systems provided a sufficient number of AVC Advantage D-10 DRE Voting Systems to ensure that parallel testing, where feasible, could be performed.

A listing of all instrumentation required to conduct the required testing is included in the pertinent attachment with the test data sheet(s).

3.4 Deliverable Materials

3.4.1 Technical Data Package

Sequoia provided the latest versions of all the required documentation as listed in Section 1.4 of this report. All manuals have an identifiable Version Number or Document Control Number or Release Date.

3.4.2 End User Documentation

Documentation which is designated by Sequoia Voting Systems to be delivered to customers is listed in Table 1-1. This documentation is indicated by an *.

4.0 SYSTEM OVERVIEW

The following paragraphs address, in greater detail, the design methodology and product description of the system submitted by Sequoia Voting Systems for testing, of which the Sequoia Technical Data Package was the source for much of this information.

4.1 Hardware

4.1.1 AVC Advantage D-10 DRE Voting System

The AVC Advantage D-10 DRE Voting System, including AVC Advantage D-10, Audio Voting Accessory 5.1, and APS Verivote Printer, is a Direct Recording Equipment (DRE) voting machine designed to read and tabulate ballots at the polling place.

4.0 SYSTEM OVERVIEW (continued)

4.1.2 AVC Advantage D-10 DRE Voting Machine

The AVC Advantage is a Direct-Record Electronic Voting Machine. It performs the following functions:

- Validate and load ballot definitions.
- Perform pre-election testing and verifications.
- Perform Election Day voting.
- Perform post-election testing and verifications.
- Print Zero Proof and Results Reports.
- Perform maintenance diagnostic tests and functions such as Audit Trail Transfer, Set Time/Date, and print the Event Log report.

The AVC Advantage DRE Voting Machine provides a full-face ballot presentation for the voter, with up to 504 voting positions. The voting positions are represented by an array of pushbutton switches and LEDs. A printed overlay is used to indicate each contest and candidate, and to provide instructions as desired by the jurisdiction. A Mylar sheet is secured on top of the printed overlay to protect it. Privacy panels, a privacy curtain and an integral booth light are standard. The AVC Advantage DRE Voting Machine is available in a horizontal and a vertical configuration.

The AVC Advantage DRE Voting Machine is tended by a poll worker. A separate Operator Panel is provided for the poll worker, and permits rapid activation for voting and monitoring of machine status (including error conditions).

The AVC Advantage DRE Voting Machine hardware consists of the following major components:

- **Main CPU:** This is an embedded AMD Elan SC400 based system, running ROM-DOS. It contains 8 Mb of DRAM, 2 Mb of Flash ROM (used for application program storage, ballot definition, and vote data storage), a PCMCIA slot (used for the results cartridge), a battery backed real time clock, and a serial port for communication with the I/O Board.
- **I/O Board CPU:** This is the original Z80 CPU. With firmware version 10, it manages I/O devices and communicates via a dedicated serial port with the Main CPU. It contains program ROM, system ROM, configuration ROM, time and date clock, backup batteries, timers and counters, speaker (beeper), and additional circuits for self-monitoring, connecting the other assemblies, and controlling AVC power consumption.
- **Voter Panel:** The Voter Panel contains all the selection and display devices for the voter. This includes an array of switch modules to select candidates and answer questions, write-in modules to enter write-in selections, cast vote switches to finalize all the voter's selections, and a booth light to light up the front of the ballot.
- **Write-in Keyboard:** The write-in keyboard and display is located below the Voter Panel. The keyboard is used for entering write-in names; the display provides prompts and confirmations to the voter. The write-in keys consist of the letters A-Z, enter (n), comma (,), hyphen (-), period (.) and apostrophe ('), plus 4 arrow keys: up, down, left, right.

4.0 SYSTEM OVERVIEW (continued)

4.1 Hardware (continued)

4.1.2 AVC Advantage D-10 DRE Voting Machine (continued)

- **Operator Panel:** The Operator Panel contains all the selection and display devices for the maintenance technician or poll worker including switches and LEDs to select and display 12 options, activate or test. An LCD message display. Indicators for ac on and low battery. Automatic power on/off when the panel is inserted or removed.
- **Seiko DPU-414 Report Printer:** A cavity located inside the AVC Advantage contains a Seiko DPU-414 Printer, which is used to provide election reports. The system printer is a 40 column thermal dot matrix printer. A photograph of the Seiko DPU-414 Report Printer is presented in Attachment A.
- **Power Supply:** The power supply includes a 32 amp-hour backup battery that can power the AVC Advantage for up to 16 hours.

The AVC Advantage DRE Voting Machine weighs approximately 265 lbs. When opened into the voting position, the AVC Advantage overall dimensions are: Height: 78", Width: 49", and Depth: 46". The AVC Advantage DRE Voting Machine is designed to operate with a standard 120 VAC, 60 Hz power source.

Photographs of each component of the AVC Advantage DRE Voting Machine described above are included in Attachment A.

4.1.3 Advantage Audio Voting Accessory 5.1

The Advantage Voting Accessory is an optional Audio Voting Accessory used for audio voting with the AVC Advantage voting machine. All voting functionality that is available to sighted voters is included for audio voting. Ballots cast with the audio interface are not distinguished in any way from those cast using visual voting.

The Audio Voting Accessory measures approximately 3.5" by 5.5" by 1.5" and is powered through a data cable attached to the AVC Advantage. The Audio Voting Accessory is enabled by the poll worker. This interface uses Sequoia's standard Rev D Audio Box. The voter navigates through the ballot using Next, Back, and Select buttons. Help instructions are available at any time. The audio box allows the voter to control the volume and playback speed.

The Audio Voting Accessory Handset utilizes 8-bit serial data, which is passed from the AVC Advantage to a 20-PIC microprocessor in the handset. In the PIC microprocessor, a 10-bit pulse-switch modulator converts serial-audio voting data into a pulse-width modulated data stream, which is then passed through a 4 kHz low-pass filter where it is amplified and then sent to the stereo jack on the handset. It includes a nylon canvas carrying case.

A photograph of the Audio Voting Accessory is presented in Attachment A.

4.0 SYSTEM OVERVIEW (continued)

4.1 Hardware (continued)

4.1.4 APS Verivote Printer

The Verivote printer is an optional accessory for the AVC Advantage. It is a thermal-type printer which attaches to the right side privacy panel of the AVC Advantage via slide rail. The Verivote is used to produce a paper record that can be reviewed by the Voter during voting. Each voter receipt is cut as it is generated.

The Verivote printer includes a ballot bag for storage of the printed receipts. During voting, the bag is secured to the printer unit via a security seal or lock.

The Verivote measures approximately 16" by 6" by 6" and weighs 7.4 pounds. It includes a nylon canvas carrying case. It is powered and receives data directly from the AVC Advantage via a stand-alone power connector and a DB-25 plug.

A photograph of the APS Verivote Printer is presented in Attachment A.

4.2 Firmware

The Advantage firmware is partitioned so that the application code resides on the audio subsystem CPU (Application CPU) and the Z80 CPU board (I/O Processor) serves the role of front-end I/O processor. Communications between the I/O Processor and Application CPU is through the serial port.

In depth discussion of the Software System Concepts are documented in the Sequoia Voting Systems AVC Advantage D-10 Software Technical Specification, Document No. 096050012, Version 1.03, dated July 2007.

5.0 TEST SPECIFICATIONS

The tests have been designed to evaluate system compliance with the requirements of the FEC 2002 VSS. The examination will include selective in-depth examination of hardware and software, the inspection and evaluation of system documentation and optional tests verifying system performance and function under normal and abnormal conditions. Specific tests for hardware, software, and integrated tests are discussed in separate sections below.

5.1 Qualification/Certification Test Specifications

Qualification/Certification testing included: the inspection and evaluation of voting system documentation; tests of voting system under conditions simulating the intended storage, operation, transportation, and maintenance environments; and operational tests verifying system performance and function under normal and abnormal conditions. Testing was limited to the AVC Advantage D-10 DRE Voting System components listed in Section 3.0 of this report.

The AVC Advantage D-10 DRE Voting System was subjected to Qualification/Certification Tests as summarized in Table 5-1.

5.0 TEST SPECIFICATIONS (continued)

5.1 Qualification/Certification Test Specifications (continued)

Table 5-1 Test Requirements

REPORT SECTION	VSS Vol. II SECTION	TEST Description
5.2	2.1	Technical Data Package Review
5.3.1.2	4.6.4	Low Temperature Test
5.3.1.3	4.6.5	High Temperature Test
5.3.1.4	4.6.3	Vibration Test
5.3.1.5	4.6.2	Bench handling Test
5.3.1.6	4.6.6	Humidity Test
5.3.2.1	4.7.1	Temperature/Power Variation Test
5.3.2.2	3.2.2.2.c (Vol. I)	Acoustic Noise Level Test
5.4.1	4.8.1	Electrical Power Disturbance Test
5.4.2	4.8.2	Electromagnetic Radiation Test
5.4.3	4.8.3	Electrostatic Disruption Test
5.4.4	4.8.4	Electromagnetic Susceptibility Test
5.4.5	4.8.5	Electrical Fast Transient Test
5.4.6	4.8.6	Lightning Surge Test
5.4.7	4.8.7	Conducted RF Immunity Test
5.4.8	4.8.8	Magnetic Fields Immunity Test
5.4.9	4.3.8 (Vol. I)	Product Safety Review, UL60950-1
5.4.10	4.1.2.4 (Vol. I)	Electrical Supply
5.4.11	4.7.2	Maintainability Test
5.4	4.7.1.1	Volume and Accuracy Test
5.5.1	4.7.4	Availability Test
5.6.1	5.4	Source Code Review
5.6.2	6.7	Functional Qualification Tests
5.6.3	6.6	Physical Configuration Audit
5.6.4	6.2.2	Witnessed Build
5.6.5	6	System Integration Testing

5.2 Review Summary of the TDP

The TDP contains information about requirements, design, configuration management, quality assurance, and system operations. The EAC requirements state that, at a minimum, the TDP shall contain the following documentation: system configuration overview; system functionality description; system hardware specifications; software design and specifications; system test and verification specifications; system security specifications; user/system operations procedures; system maintenance procedures; personnel deployment and training requirements; configuration management plan; quality assurance program; and system change notes.

A full TDP package was submitted by Sequoia. A TDP review was conducted on revisions made to the applicable AVC Advantage D-10 documents based on the changes made to the source code as listed in the AVC Advantage D-10 Change Specification, Version 1.02 April 2008. The review results were recorded in a worksheet that provided the pass/fail compliance to applicable Standards. Sequoia corrected each nonconformance observation and resubmitted the associated documents for review. This process continued until the TDP complied with all applicable standards.

5.0 TEST SPECIFICATIONS (continued)

5.2 Review Summary of the TDP (continued)

Functional testing also identified text in the TDP that conflicted with the actual operation of the system. These discrepancies were reported to Sequoia and tracked as test exceptions until verified that the applicable documents had been corrected.

5.3 Environmental Tests

Environmental tests were performed to ensure that the AVC Advantage D-10 DRE Voting System and associated machine resident firmware were in compliance with the VSS.

During test performance, the AVC Advantage D-10 DRE Voting System was configured as it would be for use in an election precinct. The AVC Advantage D-10 Voting Systems that were subjected to Environmental Testing are detailed in Table 5-2. Prior to and immediately following each test, an operational status check was performed.

Table 5-2 Environmental Test Configurations

Test	AVC Advantage DRE Voting System	
Bench Handling Vibration	Advantage: Model D-10, Hardware Rev. F, S/N 20391 APS Printer: AXSQ81007 AP790009, ADP-81007 SW:7-S0.11.017 ADA Unit: P/N 460-32690-00, Rev. D	
Low Temperature High Temperature Humidity	Advantage: Model D-10, Hardware Rev. F, S/N 23419 APS Printer: AXSQ81007 AP790004, ADP-81007 SW:7-S0.11.017 ADA Unit: N/A	
Temperature/Power Variation	Advantage: Model D-10, Hardware Rev. F, S/N 23713 APS Printer: AXSQ81007, AP790017, ADP- 81007 SW:7-S0.11.017 ADA Unit: N/A	Advantage: Model D-10, Hardware Rev. F, S/N 23419 APS Printer: AXSQ81007, AP790004, ADP-81007 SW:7- S0.11.017 ADA Unit: N/A
Temperature/Power Variation	Advantage: Model D-10, Hardware Rev. F, S/N 20391 APS Printer: AXSQ81007 AP790009 ADP-81007 SW:7-S0.11.017 ADA Unit: P/N 460-32690-00, Rev. D	Advantage: Model D-10, Hardware Rev. F S/N 33412 APS Printer: AXSQ81007 AP790017, ADP-81007 SW:7- S0.11.017 ADA Unit: N/A

5.3.1 Non-Operating Environmental Tests

The AVC Advantage D-10 DRE Voting System was subjected to various Non-Operating Environmental Tests. Prior to and immediately following each test environment, the AVC Advantage D-10 DRE Voting System was powered and subjected to operability functional checks to verify continued proper operation. The AVC Advantage D-10 DRE Voting System was not powered during the performance of any of the non-operating tests.

5.0 TEST SPECIFICATIONS (continued)

5.3 Environmental Tests (continued)

5.3.1 Non-Operating Environmental Tests (continued)

5.3.1.1 Low Temperature Test

The AVC Advantage D-10 DRE Voting System was subjected to a Low Temperature Test in accordance with section 4.6.2 of Volume II of the VSS. The purpose of this test is to simulate stresses associated with the storage of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I-Storage, with a minimum temperature of -4°F.

Prior to test initiation, the AVC Advantage D-10 DRE Voting System was subjected to a baseline operability checkout to verify system readiness. The EUT was then placed in an environmental test chamber and the chamber temperature was lowered to -4°F and allowed to stabilize. Upon temperature stabilization, the temperature was maintained for an additional four hours. The temperature was then returned to standard laboratory ambient conditions at a rate not exceeding 10°F per minute.

The AVC Advantage D-10 DRE Voting System was removed from the chamber and inspected for any obvious signs of degradation and/or damage. None were observed. The AVC Advantage D-10 DRE Voting System was successfully subjected to a post-test operability checkout.

The AVC Advantage D-10 DRE Voting System successfully completed the requirements of the Low Temperature Test. The Low Temperature Test Chamber Circular Chart, Test Setup Photographs, and Instrumentation Equipment Sheet are contained in Attachment D.

5.3.1.2 High Temperature Test

The AVC Advantage D-10 DRE Voting System was subjected to a High Temperature Test in accordance with section 4.6.5 of Volume II of the VSS. The purpose of this test is to simulate stresses associated with the storage of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 501.2, Procedure I-Storage, with a maximum temperature of 140°F.

Prior to test initiation, the AVC Advantage D-10 DRE Voting System was subjected to a baseline operability checkout to verify system readiness. The AVC Advantage D-10 DRE Voting System was then placed in an environmental test chamber and the chamber temperature was raised to 140°F and allowed to stabilize. Upon temperature stabilization, the temperature was maintained for an additional four hours. The temperature was then returned to standard laboratory ambient conditions at a rate not exceeding 10°F per minute.

The AVC Advantage D-10 DRE Voting System was removed from the chamber and inspected for any obvious signs of degradation and/or damage. None were observed. The AVC Advantage D-10 DRE Voting System was successfully subjected to a post-test operability checkout.

The AVC Advantage D-10 DRE Voting System successfully completed the requirements of the High Temperature Test. The High Temperature Test Chamber Circular Chart, test setup Photographs, and Instrumentation Equipment Sheet are contained in Attachment D.

5.0 TEST SPECIFICATIONS (continued)

5.3 Environmental Tests (continued)

5.3.1 Non-Operating Environmental Tests (continued)

5.3.1.3 Vibration Test

The AVC Advantage D-10 DRE Voting System was subjected to a Vibration Test in accordance with section 4.6.3 of Volume II of the VSS. The purpose of this test is to simulate stresses faced during transport of voting machines and ballot counters between storage locations and polling places. This test is equivalent to the procedure of MIL-STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier.

Prior to test initiation, the AVC Advantage D-10 DRE Voting System was subjected to a baseline operability checkout to verify system readiness. Upon completion, the EUT was secured to an electrodynamic shaker. One control accelerometer was affixed to the shaker table. The AVC Advantage D-10 DRE Voting System was subjected to the Basic Transportation, Common Carrier profile as depicted in Mil-Std-810D, Method 514.3, Category I, with a frequency range from 10 to 500 Hz and an overall rms level of 1.04, 0.74, and 0.20 G for a duration of 30 minutes in each orthogonal axis. Upon test completion, the AVC Advantage D-10 DRE Voting System was inspected for any obvious signs of degradation and/or damage. None were observed. The AVC Advantage D-10 DRE Voting System was successfully subjected to a post-test operability checkout.

The AVC Advantage D-10 DRE Voting System successfully completed the requirements of the Vibration Test. The Vibration Test Data Sheets/Plots, Test Setup Photographs, and Instrumentation Equipment Sheet are contained in Attachment D.

5.3.1.4 Bench Handling Test

The AVC Advantage D-10 DRE Voting System was subjected to a Bench Handling Test in accordance with section 4.6.2 of Volume II of the VSS. The purpose of this test is to simulate stresses faced during maintenance and repair of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI.

Prior to performance of the test, the AVC Advantage D-10 DRE Voting System was subjected to a baseline operability checkout. Following the checkout, each edge of the base of the machine was raised to a height of four inches above the surface and allowed to drop freely. This was performed six times per edge, for a total of 24 drops. Upon test completion, the AVC Advantage D-10 DRE Voting System was inspected for any obvious signs of degradation and/or damage. None were observed. The AVC Advantage D-10 DRE Voting System was subjected to a post-test operability checkout and continued operability verified.

The AVC Advantage D-10 DRE Voting System successfully completed the requirements of the Bench Handling Test. The Bench Handling Data Sheet, Test Setup Photographs, and Instrumentation Equipment Sheet are contained in Attachment D.

5.0 TEST SPECIFICATIONS (continued)

5.3 Environmental Tests (continued)

5.3.1 Non-Operating Environmental Tests (continued)

5.3.1.5 Humidity Test

The AVC Advantage D-10 DRE Voting System was subjected to a Humidity Test in accordance with section 4.6.6 of Volume II of the VSS. The purpose of the test is to simulate stresses encountered during storage of voting machines and ballot counters.

The AVC Advantage D-10 DRE Voting System was subjected to a baseline operability checkout to verify system readiness. Upon completion, the AVC Advantage D-10 DRE Voting System was placed in an environmental test chamber and was subjected to a 10-day humidity cycle in accordance with the 24-hour cycle depicted in MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid.

Upon test completion, the AVC Advantage D-10 DRE Voting System was inspected for any obvious signs of degradation and/or damage. None were observed. The AVC Advantage D-10 DRE Voting System was successfully subjected to a post-test operability checkout.

The AVC Advantage D-10 DRE Voting System Voting Machine System successfully completed the requirements of the Humidity Test. The Chamber Circular Chart, Test Setup photographs, and Instrumentation Equipment Sheet for the test are presented in Attachment D.

5.3.2 Operating Environmental Tests

5.3.2.1 Temperature/Power Variation Test

The AVC Advantage D-10 DRE Voting System was subjected to a Temperature and Power Variation Test in accordance with section 4.7.1 of Volume II of the VSS. The purpose of this test is to evaluate system operation under various environmental conditions. The duration of the test is 163 hours, with 48 hours in the environmental test chamber. For the remaining hours, the equipment was operated at room temperature. This test is similar to the low temperature and high temperature tests of MIL-STD-810-D, Method 502.2 and Method 501.2.

To perform the test, two Horizontal configuration and three Vertical configuration AVC Advantage D-10 DRE Voting Systems were placed inside an environmental walk-in test chamber and connected to a variable voltage power source. The temperature inside the chamber and the voltage supplied to the hardware varied from 50°F to 95°F and from 105 VAC to 129 VAC. During test, each unit was configured to run an automatic voting simulation that continuously cast and printed ballot receipts. The Environmental Test Profile, Chamber Thermal Circular Charts, and Instrumentation Equipment Sheet for the test are presented in Attachment C.

Both Models of the AVC Advantage D-10 DRE Voting System successfully completed the requirements of the Operating Environmental Test.

5.0 TEST SPECIFICATIONS (continued)

5.3 Environmental Tests (continued)

5.3.2 Operating Environmental Tests (continued)

5.3.2.2 Acoustic Noise Level Test

The AVC Advantage D-10 DRE Voting System was subjected to an Acoustic Noise Level Test to satisfy the following requirements of Section 2.2.7.2 (b) of Volume I of the VSS:

Section 2.2.7.2 of the VSS

DRE Voting Systems shall provide, as part of their configuration, the capability to provide access to voters with a broad range of disabilities. This capability shall: (a) Provide audio stimulus, (b) Provide a volume control with an adjustable amplification up to a maximum of 105dB that automatically resets to the default for each voter;

The Acoustic Noise Level Test Data Sheet indicating successful test completion is contained in Attachment C.

5.4 Electrical Tests

Electrical tests were performed to ensure that the AVC Advantage D-10 DRE Voting System and associated machine resident firmware were in compliance with the VSS. During test performance, the Advantage D-10 DRE Voting System was configured as it would be for use in an election precinct. Each Electrical test was performed with the Advantage D-10 DRE Voting System in two operational modes:

1. Simulation: The system is powered and actively processing ballots via an automated test script. Ballot receipts are printed after each ballot cast. Continual ballot processing occurs during the testing
2. Audio: the system is continuously streaming the audio voter instructions through the Audio Voting Accessory headset.

The AVC Advantage D-10 Voting Systems that were subjected to Environmental Testing are detailed in Table 5-3. Prior to and immediately following each test, an operational status check was performed.

Table 5-3 Electrical Test Configurations

Test	Advantage Configuration	
	Simulation Mode	Audio Mode
Electrical Power Disturbance Electrostatic Disruption Electromagnetic Susceptibility Electrical Fast Transients Lightning Surge Conducted RF Immunity Magnetic Fields Immunity	Advantage: Model D-10, Hardware Rev. F, S/N 23713 APS Printer: AXSQ81007, AP790006, ADP-81007 SW:7-S0.11.017 ADA Unit: P/N 460-32800-00, Rev. A	Advantage: Model D-10, Hardware Rev. F, S/N 33412 APS Printer: AXSQ81007, AP790017, ADP-81007 SW:7-S0.11.017 ADA Unit: N/A
Electromagnetic Radiation	Advantage: Model D-10, Hardware Rev. F, S/N 23419 APS Printer: AXSQ81007 AP790004 ADP-81007 SW:7-S0.11.017 ADA Unit: N/A	Advantage: Model D-10, Hardware Rev. F, S/N 23419 APS Printer: AXSQ81007 AP790004, ADP-81007 SW:7-S0.11.017 ADA Unit: N/A

5.0 TEST SPECIFICATIONS (continued)

5.4 Electrical Tests (continued)

5.4.1 Electrical Power Disturbance

Electrical Power Disturbance testing was performed in accordance with section 4.8.1 of Volume II of the VSS. This testing was performed to ensure that the AVC Advantage D-10 DRE Voting System will be able to withstand electrical power line disturbances (dips/surges) without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes and subjected to the voltage dips and surges over periods ranging from 20 ms to four hours.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Electrical Power Disturbance Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.2 Electromagnetic Radiation Test (FCC Part 15 Emissions)

Electromagnetic Radiation emissions measurements were performed in accordance with section 4.8.2 of Volume II of the VSS. This testing was performed to ensure that emissions emanating from the unit do not exceed the limits of FCC Part 15, Class B emissions. The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes during test performance.

Both AVC Advantage D-10 DRE Voting System configurations were found to comply with the required emissions limits. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.3 Electrostatic Disruption

Electrostatic Disruption testing was performed in accordance with Section 4.8.3 of Volume II of the VSS to ensure that should an electrostatic discharge event occur during equipment setup and/or ballot counting, that the AVC Advantage D-10 DRE Voting System would continue to operate normally. A momentary interruption is allowed so long as normal operation is resumed without human intervention or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes during testing. The AVC Advantage D-10 DRE Voting System was then subjected to electrostatic discharges of +/- 8 kV contact and +/- 15 kV air. Discharges were performed at areas typical of those which might be touched during normal operation, including the touch screen, user buttons, and other likely points of contact.

There was no loss of normal operation or loss of data as a result of the applied discharges.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Electrostatic Disruption Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.0 TEST SPECIFICATIONS (continued)

5.4 Electrical Tests (continued)

5.4.4 Electromagnetic Susceptibility

Electromagnetic Susceptibility testing was performed in accordance with section 4.8.4 of Volume II of the VSS. This testing was performed to ensure that the EUT would be able to withstand a moderate level of ambient electromagnetic fields without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes and then subjected to ambient electromagnetic fields at 10 V/m over a range of 80 MHz to 1000 MHz.

There was no loss of normal operation or loss of data as a result of the applied electromagnetic fields.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Electromagnetic Susceptibility Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.5 Electrical Fast Transients

Electrical Fast Transients (EFT) testing was performed in accordance with Section 4.8.5 of Volume II of the VSS to ensure that, should an electrical fast transient event occur on a power line, the AVC Advantage D-10 DRE Voting System would continue to operate without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes and then subjected to electrostatic fast transients of 2 kV applied to its AC power lines.

There was no loss of normal operation or loss of data as a result of the applied transients.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Electrical Fast Transients Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.6 Lightning Surge

Lightning Surge testing was performed in accordance with section 4.8.6 of Volume II of the VSS to ensure that, should a surge event occur on a power line due to a lightning strike, the AVC Advantage D-10 DRE Voting System will continue to operate without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes. The AVC Advantage D-10 DRE Voting System power input lines were then subjected to lightning surge testing at a level of 2 kV applied to its AC power line.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Lightning Surge Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.0 TEST SPECIFICATIONS (continued)

5.4 Electrical Tests (continued)

5.4.7 Conducted RF Immunity

Conducted RF Immunity testing was performed in accordance with section 4.8.7 of Volume II of the VSS. This testing was performed to ensure that the EUT will be able to withstand conducted RF energy onto its power lines without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes and then subjected to conducted RF energy of 10 Vrms applied to its power lines over a frequency range of 150 kHz to 80 MHz.

There was no loss of normal operation or loss of data as a result of the applied conducted RF energy.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Conducted RF Immunity Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.8 Magnetic Fields Immunity

Magnetic Fields Immunity testing was performed in accordance with section 4.8.8 of Volume II of the VSS. This testing was performed to ensure that the AVC Advantage D-10 DRE Voting System will be able to withstand AC magnetic fields without disruption of normal operation or loss of data.

The AVC Advantage D-10 DRE Voting System was configured in each of the operational modes and then subjected to AC magnetic fields of 30 A/M at a 60 Hz power line frequency.

There was no loss of normal operation or loss of data as a result of the applied magnetic field.

Both AVC Advantage D-10 DRE Voting System configurations successfully met the requirements of the Magnetic Fields Immunity Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachment E.

5.4.9 Product Safety Review

The VSS states that all voting systems shall meet the following requirements for safety:

- a. All voting systems and their components shall be designed to eliminate hazards to personnel or to the equipment itself.
- b. Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service.
- c. Equipment design for personnel safety shall be equal to or better than the appropriate requirements of the Occupational Safety and Health Act, Code of Federal Regulations, Title 29, Part 1910.

To satisfy these requirements, the voting system was subjected to a Product Safety Review in accordance with the applicable requirements of "UL Standard for Safety for Information Technology Equipment, UL 60950-1", Second Edition dated March 27, 2007.

5.0 TEST SPECIFICATIONS (continued)

5.4 Electrical Tests (continued)

5.4.9 Product Safety Review (continued)

For the purposes of product safety testing, the AVC Advantage D-10 DRE Voting Machine is defined as a Class 1 cord-connected device that is intended to be connected to a TN-S power system and operate in a pollution degree 2 environment. The AVC Advantage D-10 DRE Voting System is considered moveable equipment and has been evaluated to the relevant requirements of the Standard for Safety for Information Technology Equipment UL 60950-1, 2nd Edition.

To perform the Product Safety Review, one representative sample of the AVC Advantage D-10 DRE Voting System was subjected to the test defined in Table 5-4.

Table 5-4 Product Safety Review Test Requirements

Description	Clause	Result
Input Current	1.6.2	Compliant
Durability of Markings	1.7.13	Compliant
Access to Energized Parts	2.1.1.1	Compliant
Discharge of Capacitors in Equipment	2.1.1.7	Compliant
Resistance of Earthing Conductors and Their Terminations	2.6.3.4	Compliant
Stability	4.1	Compliant
Mechanical Strength	4.2	Compliant
Temperature Tests	4.5.2	Compliant
Touch and Protective Conductor Current	5.1.2	Compliant
Electric Strength	5.2.2	Compliant

The AVC Advantage D-10 DRE Voting System was found to be in compliance with the applicable requirements of the Standard for Safety for Information Technology Equipment UL 60950-1, 2nd Edition. The Product Safety Review data is presented in Attachment F.

5.4.10 Electrical Supply Testing

Components of voting systems that require an electrical supply shall meet the following standards:

- a. Precinct count voting systems shall operate with the electrical supply ordinarily found in polling places (Nominal 120 Vac/60Hz/1 phase).
- b. Central count voting systems shall operate with the electrical supply ordinarily found in central tabulation facilities or computer room facilities (Nominal 120 Vac/60Hz/1, nominal 208 Vac/60Hz/3 or nominal 240 Vac/60Hz/2).
- c. All voting machines shall also be capable of operating for a period of at least 2 hours on backup power, such that no voting data is lost or corrupted nor normal operations interrupted. When backup power is exhausted the voting machine shall retain the contents of all memories intact.

The Electrical Supply Test Data Sheet indicating successful test completion is contained in Attachment E.

5.0 TEST SPECIFICATIONS (continued)

5.5 System Level Volume/Accuracy Tests

The AVC Advantage D-10 DRE Voting Systems were subjected to a data accuracy test in accordance with the requirements of the VSS, Section 4.7.1.1. During the Volume and Accuracy testing, the AVC Advantage D-10 DRE Voting Systems were subjected to the casting of a large number of ballots to verify vote recording accuracy, i.e., at least 1,549,703 ballot positions correctly read and recorded. Testing was performed using an election ballot containing 223 positions. A cumulative total of 7600 ballots were cast, which exceeded the requirements of positions accurately recorded via the machine totals report. During testing, ballots were cast manually and via an automated script, and ballot receipts printed on the APS Verivote printer. The barcodes on each receipt were then scanned, totaled, and compared with the machine’s total report at the close of testing.

5.5.1 Availability

The voting system achieved at least 99 percent availability during normal operation for the applicable functions of the system.

5.5.2 Maintainability

All maintenance required actions listed in the TDP were performed by Wyle Laboratories personnel to determine the ability to perform the actions required.

5.5.3 Source Code Review Summary

The code was reviewed to evaluate its compliance with the voting standards and for its adherence to any SVS coding standards for source code. These standards are intended to ensure that the overall objectives of logical correctness, system integrity, reliability, and accuracy are being met. The AVC Advantage D-10 DRE Voting System source code reviewed consisted of the following versions:

Table 5-4 Firmware Revisions

AVC Advantage (I/O Board)	AVC Advantage (Main Board)	Audio Voting Accessory
10.4.5	10.4.6	7.7
10.4.6	10.4.8	7.8
10.4.7	10.4.9	8.0
10.4.9	10.4.13	8.1
10.5.0	10.4.16	8.3
10.5.1	10.4.18	8.4
10.5.2	10.4.22	8.6
	10.5.0	
	10.5.1	
	10.5.2	

Note: revision numbers in bold reflect final versions

The source code review reports are contained in Attachment H.

5.0 TEST SPECIFICATIONS (continued)

5.6 Software Testing

5.6.1 Functional Test Summary

Functional tests were performed to verify source specific changes associated with firmware version 10.5.2. This was done to ensure proper implementation of the changes made to the AVC Advantage D-10 DRE Voting System firmware between version 10.3.11 (the previously qualified version) and the current version release of 10.5.2. The changes associated with the 10.5.2 added functional enhancements, improvements in the overall structure, maintainability, and readability of the code as well as addressing any bugs identified during actual use or as a result of introduction through a previous step release while still in development. Additionally, some changes were imbedded in overall system operation and not specific to a singular functional attribute.

During functional testing the AVC Advantage D-10 DRE Voting System was subjected to a series of tests to simulate Election Day activities at the precinct level. These tests were performed to ensure compatibility of voting machine functions at the precinct level using the revised firmware. These included activities to simulate:

- Verification of hardware status via diagnostic reports prior to election
- Performing procedures required to prepare hardware for election operations
- Obtaining 'zero' machine report printouts on all contest fields
- Performing procedures to open the polling place and enable ballot counting
- Casting of ballots to demonstrate proper processing, error handling, and generation of audit data
- Performing hardware operations required to disable ballot counting and closing the polls
- Obtaining machine reports and verifying correctness
- Obtaining machine-generated audit logs and verifying correctness

Additionally, logic functionality of the following Ballot Logic types was verified:

- General Election
- Closed Primary Election
- Open Primary Election
- Partisan/Non-Partisan
- Straight Party
- Cross Party Endorsement
- Ballot Rotation (limited to rotation between machines)
- Recall Issues w/Options
- Split Precincts
- Vote N-of-M
- Write-In Voting
- Overvotes (disallowed) and Undervotes
 - Blank Ballots

5.0 Test Specifications (continued)

5.6 Software Testing (continued)

5.6.1 Functional Test Summary (continued)

Attachment B contains an overall functional certification matrix addressing those precinct level hardware characteristics reviewed during hardware certification testing, Attachment I contains the Functional Test Review, and Appendix A contains the Voting Tables.

5.6.2 Physical Configuration Audit (PCA)

The PCA compares the voting system components submitted for certification with the vendor's technical documentation and confirms that the documentation submitted meets the requirements of the Guidelines.

5.6.3 Witnessed Build

See attachment J for a detailed listing of the Witnessed Builds.

5.6.4 System Integration Testing

The main goal of functional testing was to verify that the Sequoia Voting Systems AVC Advantage D-10 DRE Voting System application met the VVSG (2002) standards.

The voting machine software tested was the Advantage D10 Firmware version 10.5.2. This was installed and tested on two voting machines.

The Sequoia Voting Systems AVC Advantage D-10 DRE Voting System was submitted for full functional testing under the VSS. The testing included end-to-end tests that provided a regression test of the software application.

After completion of final functional testing, Wyle Laboratories concludes that the Sequoia Voting Systems AVC Advantage D-10 DRE Voting System meets the functional requirements provided by the VSS as well as the additional requirements stated or derived from the TDP.

6.0 TEST RESULTS AND RECOMMENDATION

Upon completion of final review of the TDP, all hardware and software testing and the successful performance of the voting system during system integration testing, it was demonstrated that the Sequoia Voting Systems AVC Advantage D-10 DRE Voting System, as tested, including the AVC Advantage D-10 DRE Voting Machine, Horizontal and Vertical configurations, (Firmware Version 5.1.20), Audio Voting Accessory, and APS Verivote Printer, successfully met the qualification/certification test requirements of the FEC 2002 VSS.

This evaluation report/recommendation is valid only for the items listed in Section 3 of this report. Any changes, revisions, or corrections made to the product after this evaluation shall be reevaluated, and a revised report/recommendation will be issued. Any anomalies encountered during certification testing were successfully resolved prior to test completion.

6.0 TEST RESULTS AND RECOMMENDATION (continued)

Due to the varying requirements of individual jurisdictions, it is recommended by the VSS that local jurisdictions perform pre-election logic and accuracy tests on all systems prior to their use in an election within their jurisdiction.

6.1 Recommendation for Certification

Wyle concludes that the AVC Advantage D-10 DRE Voting System, including the AVC Advantage D-10 DRE Voting Machine, Horizontal and Vertical configurations, (Firmware Version 5.1.20), Audio Voting Accessory 5.1, Verivote Printer (Firmware Version 1.02), meets the qualification test requirements of the FEC 2002 Voting System Standards.