



**Supervisor of Elections
Dr. Arthur Anderson**

November 7, 2006 General Election

Limited
Parallel Testing Program
Report of Findings

Conducted by the
**Palm Beach County Supervisor of Elections
Parallel Election Committee**

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Palm Beach County Supervisor of Elections

November 7, 2006 General Election

Limited Parallel Testing Program

Report of Findings

I. INTRODUCTION

The federal Help America Vote Act (HAVA), enacted by Congress and signed into law in October 2002, required a number of election reforms and provided funding for improvements in voting systems.

HAVA provided incentives for counties to purchase Direct Recording Electronic (DRE) voting machines. The adoption of DRE voting machines gave rise to public concerns about the security of these systems. The principal concern expressed has been the possibility that unauthorized programmers could manipulate the software that counts ballots on DRE machines.

The Brennan Center for Justice at New York University School of Law recently published a report titled, "*The Machinery of Democracy: Protecting Elections in an Electronic World*" as part of the Center's Voting Rights & Security Series. The report identified eight recommendations for making voting systems significantly more secure; the number two recommendation is that election officials conduct parallel testing of electronic voting machines. The report states, in part:

"For paperless DRE voting machines, parallel testing is probably the best way to detect most software-based attacks, as well as subtle software bugs that may not be discovered during inspection and other testing."

"Parallel Testing is particularly valuable to address some of the security questions that have been raised about Direct Recording Electronic voting machines (for example touch-screen voting machines), but it is potentially applicable to all electronic vote counting systems."

"There should be no question that if properly implemented, Parallel Testing would make a Trojan Horse attack more difficult."

The full report may be viewed on the Brennan Center for Justice Website at www.brennancenter.org.

Current federal, state, and county testing of DRE voting machines occurs prior to elections and does not mirror actual voting conditions. This creates the potential that code could be present that would be resistant to these test processes yet affect the accuracy of a system on any given election day. Examples of this type of tampering might include DRE voting machines programmed to activate code on a specific date (e.g. November 7, 2006) or when the equipment is in operation for less than a certain number of hours.

Parallel testing supplements the current logic and accuracy testing processes. The goal is to determine the presence of malicious code by testing the accuracy of the machines to record, tabulate, and report votes using a sample of DRE voting machines under simulated voting conditions on Election Day.

Palm Beach County Supervisor of Elections, Dr. Arthur Anderson, established an Election Technology Advisory Committee in the spring of 2006 for the purpose of investigating, evaluating and making recommendations regarding the use and security of electronic voting machines. Pursuant to the subsequent Technology Advisory Committee recommendations and findings outlined in the Brennan Center Report, Dr. Anderson established the Parallel Election Committee (Committee) for the purpose of developing and conducting a testing program for the November 7, 2006, General Election. The test

methodology developed by the Committee was to randomly select voting machines and test the accuracy of those machines to record, tabulate and report votes in a simulated election environment on Election Day.

Dr. Anderson's charge to the Committee was as follows:

"In order to provide for the transparency in the election process and verify the accuracy and reliability of the Sequoia Voting units, The Palm Beach County Supervisor of Elections will establish a Parallel Election Committee (PEC), for the purpose of conducting a simulated election that parallels in time the hours available for public voting on Election Day for the 2006 Primary and General Elections.

The PEC will oversee development of a predetermined scrip for voting, and conduct of the election, inclusive of the opening and closing of the polls. A post election evaluation of processes and results will occur."

Since parallel testing of DRE voting machines is a new phenomenon, Dr. Anderson directed that a Pilot¹ Program be conducted for the September 5, 2006 Primary Election to provide experience for the Committee in developing and implementing a Parallel Testing Program for future elections.



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**Supervisor of Elections Dr. Anderson and Judge Barry Cohen
Survey Testing Activities on November 7, 2006 as Tester Chris Gillette Looks On**

For the November 7, 2006 General Election, Dr. Anderson directed that a Limited² Parallel Testing Program be developed and conducted.

¹ The Pilot program tested three DRE voting machines using a ballot style from one precinct.

² The Limited program tested a statistically valid sample of DRE voting machines assigned to precincts with at least ten (10) DRE voting machines. Defining the pool in this manner had the least impact to the staff responsible for the DRE equipment management and represented 41.6% of the registered voters in the Palm Beach County.

An independent consultant³ experienced in parallel testing was retained to assist the Committee in designing and conducting both the September 5, 2006 Pilot Program and the November 7, 2006 Limited Parallel Testing Program.

The Committee responsible for the November 7, 2006 Limited Parallel Testing Program was comprised of community representatives and staff of the Supervisor of Elections (SOE) office.

Parallel Election Committee	
Member Name	Affiliation
Pamela Goodman	President, Palm Beach County League of Women Voters
Christopher Gillette	Palm Beach County Democratic Party
Michael Jackson	National Association for the Advancement of Colored People
Marilyn Parmet	Palm Beach County Republican Party
Dr. Don Kerbis	Supervisor of Elections, Administrative Assistant to Dr. Anderson
Laurence Davenport	Supervisor of Elections, Director of Business Affairs/CFO
Adina Serell	Supervisor of Elections, Special Events Coordinator
Lourdes Stacey	Supervisor of Elections, Executive Secretary to Dr. Anderson

Table 1

The Parallel Testing Program (Program) provides a “snapshot” of a specific election day. Thus, the value of the Program is limited to the November 7, 2006 Election. The Program must be repeated for future elections in order to provide validation of the accuracy of the County’s DRE voting machines in those elections.

II. LIMITED PARALLEL TESTING PROGRAM OVERVIEW

The test provided for the random selection of DRE voting machines after the County had performed logic and accuracy testing according to the County procedure and secured the machines for the election and before the County delivered the machines to the various polling places. The machines were tested in an environment that closely simulated an actual election including: testing the machines during the time precinct voting is taking place on Election Day, November 7, 2006 in Palm Beach County; testing the machines while in ‘Official Election Mode’; executing scripts which had been generated using poll data representative of the electorate of the precincts to which the selected DRE voting machines were programmed prior to the test selection.

³ Jocelyn Whitney, owner of the management consulting firm JBS Associates, developed and conducted the first Parallel Testing Program in the nation for California’s primary and general elections in 2004 and conducted parallel testing for that state’s special election in 2005. Ms. Whitney was the primary contributor to the parallel testing component included in the recently released Brennan Center for Justice Report “*The Machinery of Democracy: Protecting Elections in an Electronic World*”.

A. Equipment Selection

The Committee directed that a statistically valid sample of DRE voting machines assigned to precincts with at least ten (10) DRE voting machines be selected for testing. Defining the pool in this manner represented the least impact to the staff responsible for the SOE DRE equipment management. Machines were not selected from smaller precincts where additional DRE voting machines would be required to fill in behind the DRE machines selected for testing. This pool represented 41.6% of the registered voters in the Palm Beach County and the Committee wished to formally recognize this by labeling the testing program as "Limited".

The Committee further agreed to the following assumptions when defining the parameters for the statistical sample:

1. If tampering were to occur, it would occur on at least 10% of the machines, and
2. That the sample must provide a 90% probability that at least one tampered machine would be in the pool of selected DRE voting machines.

The criteria above required that twenty-two DRE machines be selected for testing from a predetermined list of precincts with a minimum of ten DREs assigned. Selection of DRE voting machines assigned to these precincts was determined randomly, utilizing a random number generator software tool to eliminate human error or bias. The twenty-two machines were fully operational, prepared for the November 7, 2006 General Election by the County and sealed against tampering according to normal County procedures.

Representatives from the SOE's Office and the Committee mutually agreed upon day and time for the purpose of identifying and securing the selected DRE machines and other equipment necessary to conduct the testing on November 7, 2006. The Committee representative attached tamper evident, serially numbered security seals on the selected voting machines so as to identify the devices as part of the Parallel Testing Program and to provide additional protection against tampering.

The machines were then segregated from the balance of the County inventory and secured on the County premises until November 7, 2006. Voter card activators, voter access cards and other items necessary for testing were also secured on the County premises.

Table 2, on the following page, identifies the serial numbers of the DRE voting machines selected for testing and the test station to which the machine was assigned.



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Program Co-Director Dr. Don Kerbis Oversees Testing Activities on November 7, 2006

DRE Voting Machines Selected for Testing	
Station A	5885
	6292
	6692
	6726
	7203
	7410
	7439
Station B	7515
	7634
	8231
	8836
	8914
	8950
	9160
Station C	9258
	9546
	9569
	9645
	18724
	21284
	21296
	21370

Table 2

The Committee and SOE staff agreed on a secure, appropriately equipped location with controlled access, within the County's main election office to conduct the testing on November 7, 2006. The room provided adequate lighting, power, tables for equipment and testing supplies, chairs, etc.

B. Test Script Development

Once the DRE voting machines were identified the SOE staff identified the ballot style associated with each precinct to which the machines were assigned. The identified twelve specific ballot styles provided the foundation for the development of test scripts used for the associated DRE machine.

1. Script Conditions

Test scripts were designed to simulate the actual voter experience. Each script represented the attributes of a voter (regular or provisional voter status, party affiliation/voter preferences, and language choice) and specified a candidate for which the tester should select in a specific contest. The test script form was laid out to record requisite details of the voting process for a "test voter" and served as a means to tally test votes and assist in verifying if all votes were properly recorded, compiled, and reported by the DRE voting machine.

For each of the twenty-two precincts, 47 test scripts were developed. In total, the scripts were comprised of 1,034 individual scripts with approximately 27,918 voter selections. Test script selections were limited to the contests and contest candidates appropriate to the ballot style and matched actual ballot options. The following tables illustrate the conditions applied to the scripts during development.

Test scripts were developed consistent with party voting rules.

Party Voting Rules	
All voters may vote for any candidate in any contest regardless of party affiliation.	

Table 3

Each set of scripts included one provisional status ballot.

Voter Status	
Regular	46 scripts
Provisional	1 script

Table 4

Test scripts were developed to reflect voting preferences by party in one of the following three categories.

Party Voting Preferences
Straight Party
Straight Party minus 1-3 contests
Random

Table 5

Each Script set will include one ballot with a write-in candidate.

Write in Candidate	
No Write In	46 scripts
Write In	1 script

Table 6

Test script sets included contest drop offs as indicated below.

Contest Drop Off	
Every contest available on the ballot is included on the script.	78%
Only one contest available on the ballot is included on the script (Governor Contest)	.5%
For contest other than judicial—most, but not all contests, available on the ballot is included on the script.	20-23%
For District Court of Appeal and Supreme Court contests	20%
For County and Circuit Judges contests	21-25%

Table 7

Test scripts were generated using poll data representative of the electorate of the precincts to which the selected DRE voting machines were programmed prior to the test selection. The Committee observed that not all individuals registered as Hispanic would chose to vote a Spanish ballot. Therefore a formula was developed to provide guidance in assigning ballots to be cast using a Spanish language choice for each precinct, as follows.

Language Choice
In precincts where Hispanic registered voters represented less than 10% of the total registered voters, for the purpose of script development, it was assumed that 20% of the registered Hispanic voters would choose to cast Spanish ballots
In precincts where Hispanic registered voters represented 10-20% of the total registered voters, for the purpose of script development, it was assumed that 40% of the registered Hispanic voters would choose to cast Spanish ballots
In precincts where Hispanic registered voters represented 21% or more of the total registered voters, for the purpose of script development, it was assumed that 60% of the registered Hispanic voters would choose to cast Spanish ballots

Table 8

Table 9, on the following pages, illustrates the demographic data developed for each of the twenty-two precincts.

Demographics by Precinct							
1076							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	578	0.32	15	12	0.02	0.32	0
Republican	771	0.43	20	9	0.01	0.24	0
Other	430	0.24	11	8	0.02	0.21	0
Total	1779	1.00	47	29	0.02	0.77	0
1132							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	739	0.39	18	23	0.03	0.57	0
Republican	712	0.37	18	18	0.03	0.44	0
Other	455	0.24	11	14	0.03	0.35	0
Total	1906	1.00	47	55	0.03	1.36	0
2112							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	722	0.42	20	188	0.2604	5.16	3
Republican	433	0.25	12	116	0.2679	3.18	2
Other	559	0.33	15	209	0.3739	5.73	3
Total	1714	1.00	47	513	0.2993	14.07	8
2120							
Party	Total	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	802	0.42	20	97	0.12	2.36	1
Republican	667	0.35	16	103	0.15	2.51	1
Other	461	0.24	11	121	0.26	2.95	1
Total	1930	1.00	47	321	0.17	7.82	3

Table 9 (continued)

2128							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	895	0.43	20	70	0.0782	1.59	1
Republican	612	0.30	14	33	0.0539	0.75	0
Other	559	0.27	13	60	0.1073	1.36	0
Total	2066	1.00	47	163	0.0800	3.71	1
3074							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	992	0.46	22	76	0.0766	1.66	1
Republican	651	0.30	14	29	0.0445	0.63	0
Other	511	0.24	11	56	0.1096	1.22	0
Total	2154	1.00	47	161	0.0700	3.51	1
4110							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	754	0.40	19	17	0.0225	0.43	0
Republican	638	0.34	16	19	0.0298	0.48	0
Other	485	0.26	12	29	0.0598	0.73	0
Total	1877	1.00	47	65	0.0300	1.63	0
4146							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	824	0.43	20	49	0.0595	1.20	0
Republican	605	0.31	15	22	0.0364	0.54	0
Other	493	0.26	12	47	0.0953	1.15	1
Total	1922	1.00	47	118	0.0600	2.89	1

Table 9 (continued)

4147							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	887	0.47	22	11	0.0124	0.27	0
Republican	606	0.32	15	19	0.0314	0.47	0
Other	396	0.21	10	18	0.0455	0.45	0
Total	1889	1.00	47	48	0.0300	1.19	0
5022							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	1064	0.59	28	46	0.0432	1.20	0
Republican	300	0.17	8	14	0.0467	0.37	0
Other	438	0.24	11	30	0.0685	0.78	0
Total	1802	1.00	47	90	0.0500	2.35	0
5032							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	1256	0.58	27	6	0.0048	0.13	0
Republican	417	0.19	9	5	0.012	0.11	0
Other	497	0.23	11	8	0.0161	0.17	0
Total	2170	1.00	47	19	0.0100	0.41	0
5041							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	1346	0.70	33	5	0.0037	0.12	0
Republican	228	0.12	6	0	0	0.00	0
Other	354	0.18	9	0	0	0.00	0
Total	1928	1.00	47	5	0	0.12	0

Table 9 (continued)

5096							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	599	0.35	16	9	0.0150	0.25	0
Republican	625	0.37	17	16	0.0256	0.44	0
Other	487	0.28	13	13	0.0267	0.36	0
Total	1711	1.00	47	38	0.0200	1.04	0
5136							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	792	0.44	21	58	0.0732	1.53	1
Republican	500	0.28	13	24	0.0480	0.63	0
Other	494	0.28	13	56	0.1134	1.47	0
Total	1786	1.00	47	138	0.0800	3.63	1
5138							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	# of scripts	Hispanic Scripts by Party
Democrat	1222	0.53	25	38	0.0311	0.78	0
Republican	501	0.22	10	26	0.0519	0.53	0
Other	565	0.25	12	37	0.0655	0.76	0
Total	2288	1.00	47	101	0.0400	2.07	0
6054							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	613	0.29	14	17	0.0277	0.38	0
Republican	895	0.43	20	12	0.0134	0.27	0
Other	589	0.28	13	6	0.0102	0.13	0
Total	2097	1.00	47	35	0.0200	0.78	0

Table 9 (continued)

6132							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	724	0.28	13	16	0.0221	0.29	0
Republican	1160	0.45	21	47	0.0405	0.86	0
Other	683	0.27	13	41	0.0600	0.75	0
Total	2567	1.00	47	104	0.0400	1.90	0
6154							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	754	0.35	17	53	0.0703	1.17	0
Republican	738	0.35	16	59	0.0799	1.30	1
Other	646	0.30	14	55	0.0851	1.21	0
Total	2138	1.00	47	167	0.0800	3.67	1
6156							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	787	0.38	18	90	0.1144	2.05	1
Republican	753	0.37	17	57	0.0757	1.30	0
Other	520	0.25	12	71	0.1365	1.62	0
Total	2060	1.00	47	218	0.1100	4.97	1
7032							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	1799	0.83	39	8	0.0044	0.17	0
Republican	91	0.04	2	2	0.0220	0.04	0
Other	267	0.12	6	5	0.0187	0.11	0
Total	2157	1.00	47	15	0.0100	0.33	0

Table 9 (continued)

7054							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	2001	0.85	40	11	0.005	0.22	0
Republican	103	0.04	2	3	0.029	0.06	0
Other	242	0.10	5	9	0.037	0.18	0
Total	2346	1.00	47	23	0.010	0.46	0
7150							
Party	#	%	# Scripts By Party	# reg. Hispanic	% of total registered	% of scripts	Hispanic Scripts by Party
Democrat	678	0.57	27	22	0.0324	0.87	0
Republican	263	0.22	10	8	0.0304	0.31	0
Other	254	0.21	10	8	0.0315	0.31	0
Total	1195	1.00	47	38	0.03	1.49	0

Table 9

Voter scenarios are scripted changes that test choices voters make while executing a single script and were randomly placed within a script's sequence of contest selections.

Voter Scenarios
Change a specified vote selection while on the same screen.
Change a specified vote selection after advancing one or more screens
From the confirmation screen, return to a contest and change vote selection and then quickly scroll to the confirmation screen.
From the cast ballot screen, and before casting the ballot, return to a specified contest and then change vote selection.
From the confirmation screen, return to a specified contest and make no change, slowly scroll to the confirmation screen.
From the confirmation screen, return to a specified contest and change to "no selection" (blank), quickly scroll to the confirmation screen. Return to the specified contest, reselect candidate and scroll to the confirmation screen.
From the confirmation screen, return to [insert contest with no selection] contest and make a selection and scroll to the confirmation screen.

Table 10

2. Script Procedures

The procedure for creating a test script consisted of the following:

- a. Determine the precinct to be represented
- b. Secure the voter demographic data for the precinct for which a script is being developed
- c. Determine the percentage of scripts that should be developed to represent the party affiliation/voter preferences for the specific precinct Democratic, Republican, NPA
- d. Of the party affiliations determine the number of Hispanic registered voters
- e. Apply the formula comparing the number of registered Hispanic voters to the total registered voters to determine the number of Spanish ballots to include in this precinct script set
- f. Determine where in the script and for what contests the seven voter scenarios will appear
- g. Select a series of voting preferences for contests that will collectively represent:
 1. The predetermined drop off rate (under vote)
 2. Contests may be common to all precincts and/or specific to a precinct
- h. Identify at least one script within each precinct set and insert one write in candidate

3. Script Components

Each test script consisted of the following components.

Section 1:

This section documented who executed the test script and when the script was initiated.

DRE Voting Machine serial number –This was completed by the tester at the time the script was initiated

Card Activator serial number –This was completed by the tester at the time the script was initiated

Tester Name – The tester name was filled in when the script was initiated.

Observer Name– The observer name was filled in when the script was initiated.

Scheduled Time Block – The period of time in which the script was scheduled to be completed was pre-printed on the script.

Actual time Initiated – The actual time the script was initiated is filled in by the tester when the script was initiated.

Provisional – The indicator specifying whether the test voter is voting under a provisional status was pre-printed on the script.

Language Choice—The language to be activated for the test script was pre-printed on the script.

Section 2:

This section outlined the steps required to complete the test script.

- Step 1** instructed the tester to display the test script number so it was clearly visible to the video camera. This would facilitate the process of researching anomalies through the review of the video recordings.
- Step 2** instructed the tester to activate a voter card consistent with language choice and voter status indicated in section 1.
- Step 3** instructed the tester to insert the voter card into the DRE voting machine.
- Step 4** instructed the tester which candidate to select in each specified contest. Common voter scenarios were randomly placed within a script's sequence of contest selections. When the vote selection is made on the screen, the tester is instructed to check the "select" box on the test script.
- Step 5** instructed the tester to stop at the confirmation screen.
- Step 6** instructed the observer to check each vote selection and verify that it is consistent with the script. If it was, the observer was instructed to initial the verified box. If a vote selection was not consistent with the script, the observer was instructed to initial the defect box, complete a discrepancy report, document the report number beside the defect box and inform the tester of the appropriate correction.
- Step 7** instructed the tester to cast the ballot once all the vote selections are confirmed as correct.

C. Tester Selection, Roles and Responsibilities

Test teams were comprised of the eight Committee members, one testing consultant and three video production consultants.

The twenty-two DRE voting machines were assigned to one of three testing stations designated as Test Station A, Test Station B, and Test Station C. Each test station was staffed with a tester, an observer, a director—or in the case of Test Station B, a recorder—and a video camera operator. Since there were two Co-Directors on the Committee the test consultant fulfilled a modified director's role designated as a "recorder" for Test Station B.

The responsibilities of the team members were divided into four roles; tester, observer, video operator recorder and director/reorder.

1. The responsibility of the tester was to:
 - Read the test script carefully.
 - Record the information in Section 1 of the test script – Tester, Observer, Video Operator(s), Actual Start Time.
 - Activate the voter access card in accordance with the test script (check for voter status, language choice—default is English).
 - Make voting selections on the screen in accordance with the test script.
 - Stop at the confirmation/review screen.
 - Wait while the observer checks the vote selections for consistency with the test script.

- If the observer indicates a vote is inconsistent with the test script the observer will request the tester to make the appropriate correction.
- Once the Observer indicates that all the selections are consistent with the test script the observer will request the tester to proceed.
- Cast the ballot.



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Tester Marilyn Parmet Executes a Test Script on November 7, 2006

2. The responsibility of the observer was to:
 - Read the test script carefully.
 - Verify that the voter access card is activated in accordance with the test script (voter status, verify language choice).
 - Verify that the vote selections made by the tester are consistent with the test script.
 - If vote selections are consistent with the test script, verbally indicate to the tester that he/she may proceed.
 - If vote selections are not consistent with the test script, document each vote selection that is incorrect and request the tester return to the appropriate screen and correct the vote selection.
 - Complete a Discrepancy Report and request the Director review and sign off on the report.
 - Record the Discrepancy Report number in the box corresponding to the vote selection that is incorrect.
 - Request the tester move forward to the confirmation/review screen.
 - Review as noted above, verify that all vote selections made by the tester are consistent with the test script and then verbally indicate to the tester that he/she may proceed.
 - Observe the tester cast the ballot

3. The responsibility of the video operator is to:

- Secure and have available supplies to video record 14+ hours of testing activity.
- Record the pre-test activities including documenting the condition of the security labels, equipment set-up, printing of “zero tally report”, and opening the polls.
- Set-up camera to capture activity as described below:
 - To record the stationary DRE screen throughout the course of the day beginning precisely at 7:00 a.m. (opening of the polls) regardless of whether the test team is ready to begin the testing.
 - To remain focused on the DRE unit screen at all times with the exception of changing tapes. All testing activity on the DRE unit shall STOP while tapes are changed and labeled.



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**Rashard Price of 7th Pyramid Productions
Keeps the Camera Focused on the Testing Activity**



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Pre-Test Set Up on November 6, 2006

4. The responsibility of the director was to:
 - Oversee and manage all testing activities.
 - Ensure that the voting system equipment is secure at all times and that at no times are there fewer than two team members in the room with the equipment.
 - Ensure that the video equipment is recording in such a manner so as to capture every vote selection.
 - Ensure testing stops when the video camera is not recording (i.e. during tape changes, equipment malfunction)
 - Ensure the test scripts are executed correctly and consistent with the time schedule.
 - Prepare Discrepancy Reports for assigned Station and evaluate how each situation that prompts the completion of a discrepancy report may affect tally outcomes
 - Ensure all pre- and post-test activities are completed according to the Activity Checklist.
 - Ensure that all testing artifacts are collected, sealed, and secured.
 - Recognize and elevate issues, as appropriate.

5. The responsibility of the recorder was to:

- For Station B, assist in ensuring that the voting system equipment is secure at all times
- For Station B, assist in ensuring that the video equipment is recording in such a manner so as to capture every vote selection
- For Station B, assist in ensuring testing stops when the video camera is not recording (i.e. during tape changes, equipment malfunction)
- For Station B, assist in ensuring the test scripts are executed correctly and consistent with the time schedule
- For Station B, prepare discrepancy reports and assist with observer tasks
- For Station B, assist in ensuring all pre- and post-test activities are completed according to the Activity Checklist.
- For Station B, assist in ensuring that all testing artifacts are collected, sealed, and secured.
- Recognize and elevate issues, as appropriate

III. NOVEMBER 6-7, 2006 TEST ACTIVITIES

On November 6, 2006 members of the Committee and the video production consultant moved the video equipment and the DRE voting machines to the testing area in the SOE voting machine warehouse. The DRE voting machines were set up in three testing stations designated as Test Station A, Test Station B, and Test Station C.



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Program Co-Director Pam Goodman Ensures Proper Set Up of Test Station C

The test team was scheduled to arrive at the County at 6:00 a.m. on November 7, 2006 to begin test preparations.

A. Pre-Test Set Up

From 6:00 a.m. to 7:00 a.m. the team performed the following activities.

1. Coordinated with the video camera operator to ensure all relevant activity was recorded.
2. Examined and documented the condition of the tamper evident cables applied to the equipment using the Equipment Security and Chain of Custody form.
3. Setup the DRE voting machines and card activator equipment.
4. Organized all equipment and supplies.
5. Generated the "zero tally" report for each DRE voting machine.



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Labels with the DRE Voting Machine Serial Numbers Were Affixed Above the Screen Face to Facilitate Machine Identification During the Reconciliation of Test Discrepancies



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Testers Adina Serell and Michael Jackson Conduct Pre Test Activities on November 7, 2006

B. Executing the Test Scripts

Test teams executed test scripts starting a few minutes after 7:00 a.m. until 7:00 p.m.



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Test Station A Team Members Carry Out Test Activities on November 7, 2006

C. Documenting Discrepancies

During the course of the test, a Discrepancy Report was completed for each deviation from the test script and/or test process and for any issues related to equipment malfunction. Discrepancy Reports recorded the specific event, the time it occurred, a test order number if applicable, and were numbered sequentially to ensure all reports were accounted for at the completion of the test. Discrepancy Reports were specific to a DRE voting machine and were secured when testing was completed, along with all other testing artifacts.



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**Laurence Davenport Documents a
Test Discrepancy on November 7, 2006**

D. Post Test Activities

Between 7:00 p.m. and 8:00 p.m. each test station performed the following tasks for each DRE voting Machine included in the station.

1. Generated the closing tally tape,
2. Removed the memory cartridge,
3. Using a clean DRE voting machine secured for this purpose, generated a cartridge data printout,
4. Secured the DRE voting machines with tamper evident security seals and documented the security seal serial numbers,
5. Inventoried and verified labels on all video recordings, and
6. Completed the *Activities Checklist* form ensuring all required test artifact items were secured, including the following.
 - a. Executed Test Scripts
 - b. Discrepancy Reports
 - c. DRE Memory Cartridge
 - d. DRE voting machine internal zero and tally tape
 - e. DRE voting machine memory cartridge tally tape
 - f. Completed Activity Checklist
 - g. Video recordings on DVDs for each station

The test equipment was then returned to the controlled access storage location where it will remain until directed by the Supervisor of Elections.

The test team did not reconcile the tally tapes on November 7, 2006 and had no knowledge of the expected outcomes.

IV. TEST DATA RECONCILIATION

The analysis of the data and the reconciliation of actual to expected results began on November 8, 2006 and ended on November 9, 2006 and included the following tasks.

1. The paper tape printouts and the memory cartridge data from each DRE voting machine were compared to the expected baseline tally figures to identify inconsistencies between the actual results and the expected results.
2. Discrepancy Reports were reviewed and analyzed to determine what, if any, impact the described discrepancy would have on the actual results.
3. If a discrepancy was not resolved by a review of the Discrepancy Reports, the video recordings of the testing were reviewed and analyzed.
4. All other discrepancy reports were reviewed in order to understand all issues that impacted the testing teams. (There were many discrepancy forms completed by team members that did not affect the actual results. These discrepancies related to testers having to "tap" multiple times for a vote selection to register on the DRE or testing delays due to changing tapes for the video recordings.)

The specific test results are detailed below. The analysis is divided into three sections: section 1 describes any variations from the test methodology experienced by the team during the test, section

2 describes the comparison of the actual results to the expected baseline results and section 3 describes the process used to determine the source of the discrepancies, if any.

Station A

1. Variations in Test Methodology

Twenty-two test scripts were executed on each of the seven DRE voting machines included in this Test Station for a total of 154 test scripts and approximately 4,158 vote selections. Documented variations are noted in the table below.

DRE #	Test Station A Documented Variations
5885	Started at 7:20 am.
6292	None
6692	None
6726	Experienced difficulty keying in write-in candidate names
7203	None
7410	None
7439	None

Table 11

2. Comparison of the Actual to the Expected Results

The actual results reconciled with expected results.

3. Reconciliation of Discrepancies

As the actual results matched the expected results, no further analysis was required.

Station B

1. Variations in Test Methodology

Twenty-two test scripts were executed on each of the seven DRE voting machines included in this Test Station for a total of 154 test scripts and approximately 4,158 vote selections.

The ballot activated with a language choice of Spanish did not provide for the review of voter selections on the confirmation screen for the Court of Appeals contests or the Constitutional Amendments.

Other documented variations are noted in the following table.

DRE #	Test Station B Documented Variations
7515	Multiple taps required to register vote selection—25 occurrences
7634	Multiple taps required to register vote selection—34 occurrences
8231	Multiple taps required to register vote selection—29 occurrences Experienced difficulty keying in write-in candidate names
8836	Multiple taps required to register vote selection—30 occurrences Experienced difficulty keying in write-in candidate names
8914	Multiple taps required to register vote selection—31 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'A' and 'E')
8950	Multiple taps required to register vote selection—1 occurrence
9160	Multiple taps required to register vote selection—24 occurrences

Table 12

2. Comparison of the Actual to the Expected Results

- a. For machine 7515 initial comparison of the paper tally results to expected results identified a discrepancy in the contest for Governor. The actual results recorded one additional vote for candidate Jim Davis and one less vote for candidate Karl C.C. Behm than the expected results.
- b. The initial comparison of the memory cartridge results to expected results identified a discrepancy in the contest for Governor. The actual results recorded one additional vote for candidate Jim Davis and one less vote for candidate Karl C.C. Behm than the expected results.

3. Reconciliation of Discrepancies

None of the discrepancy reports completed by the team on November 7, 2006 identified the cause of the identified discrepancy.

A review of the video recording identified the source of the discrepancy to be a tester error. Test Order Number 10 instructed the tester to select candidate Jim Davis in the Governor contest. Additionally, this test included a voter scenario that, at the confirmation screen, instructed the tester to return to the Governor contest and change the previous vote selection for candidate Jim Davis to candidate Karl C.C. Behm. The test team inadvertently skipped over the voter scenario and cast the ballot, resulting in the two identified discrepancies.

Station C

1. Variations in Test Methodology

Twenty test scripts were executed on each of the eight DRE voting machines included in this Test Station for a total of 160 test scripts and approximately 4,320 vote selections.

The ballot activated with a language choice of Spanish did not provide for the review of voter selections on the confirmation screen for the Court of Appeals contests or the Constitutional Amendments.

Other documented variations are noted in the table below.

DRE #	Test Station C Documented Variations
9258	Late poll open due to delayed video recording set up Multiple taps required to register vote selection—5 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'A' and 'G')
9546	Multiple taps required to register vote selection—35 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'A' and 'S')
9569	Multiple taps required to register vote selection—15 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'A' and 'E')
9645	Multiple taps required to register vote selection—37 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'A', 'O' and 'S' and the space bar)
18724	Multiple taps required to register vote selection— 8 occurrences
21284	Multiple taps required to register vote selection— 45 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'E', 'L' and 'T' and the space bar)
21296	Multiple taps required to register vote selection— 17 occurrences Experienced difficulty keying in write-in candidate names (especially using the letters 'C', 'R' and 'T')
21370	Multiple taps required to register vote selection— 47 occurrences

Table 13

2. Comparison of the Actual to the Expected Results
 The actual results reconciled with expected results.
3. Reconciliation of Discrepancies
 As the actual results matched the expected results, no further analysis was required.

V. TEST FINDINGS

A. Accuracy of the DRE Voting Machines

The DRE voting machines tested on November 7, 2006 accurately recorded, tabulated and reported the test votes cast.

B. Other Findings

There are concerns regarding the usability of the DRE voting machines identified during the testing. These issues did not affect the vote tallies but are related to difficulties experienced by the testers (and presumably actual voters) in using the machines. As noted above, several of the DRE voting machines required multiple "tapping" of the screen to record votes at a disturbing frequency. In addition, on scripts where the tester was instructed to select Spanish as the ballot language, the confirmation screen did not reflect the vote selections made for the Constitutional Amendment contests or the District Court of Appeal contests.

VI. COMMITTEE RECOMMENDATIONS

The Committee recommends the Supervisor of Elections schedule a meeting with the appropriate SOE staff, Sequoia Voting Systems staff and as many members of the Committee as are available for the purpose of discussing usability issues identified during the test and noted above.