Logic and Accuracy Testing

Presented by Commissioner Marks
and Deputy Commissioner Harlow

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Defining L & A Testing

•The 2005 VVSG defines logic and accuracy testing as: "Testing of the tabulator setups of a new election definition to ensure that the content correctly reflects the election being held (i.e., contests, candidates, number to be elected, ballot styles) and that all voting positions can be voted for the maximum number of eligible candidates and that results are accurately tabulated and reported."

•At a very high level, preparation for and implementation of logic and accuracy testing by a local jurisdiction includes the following:

•Verification that the contests, ballot styles, etc., are correctly coded for each precinct.

•Preparation of test decks for voting systems that utilize ballot cards or paper ballots (i.e. optical scan ballots) that will ensure the precinct or central tabulating equipment is accurately tabulating votes cast.
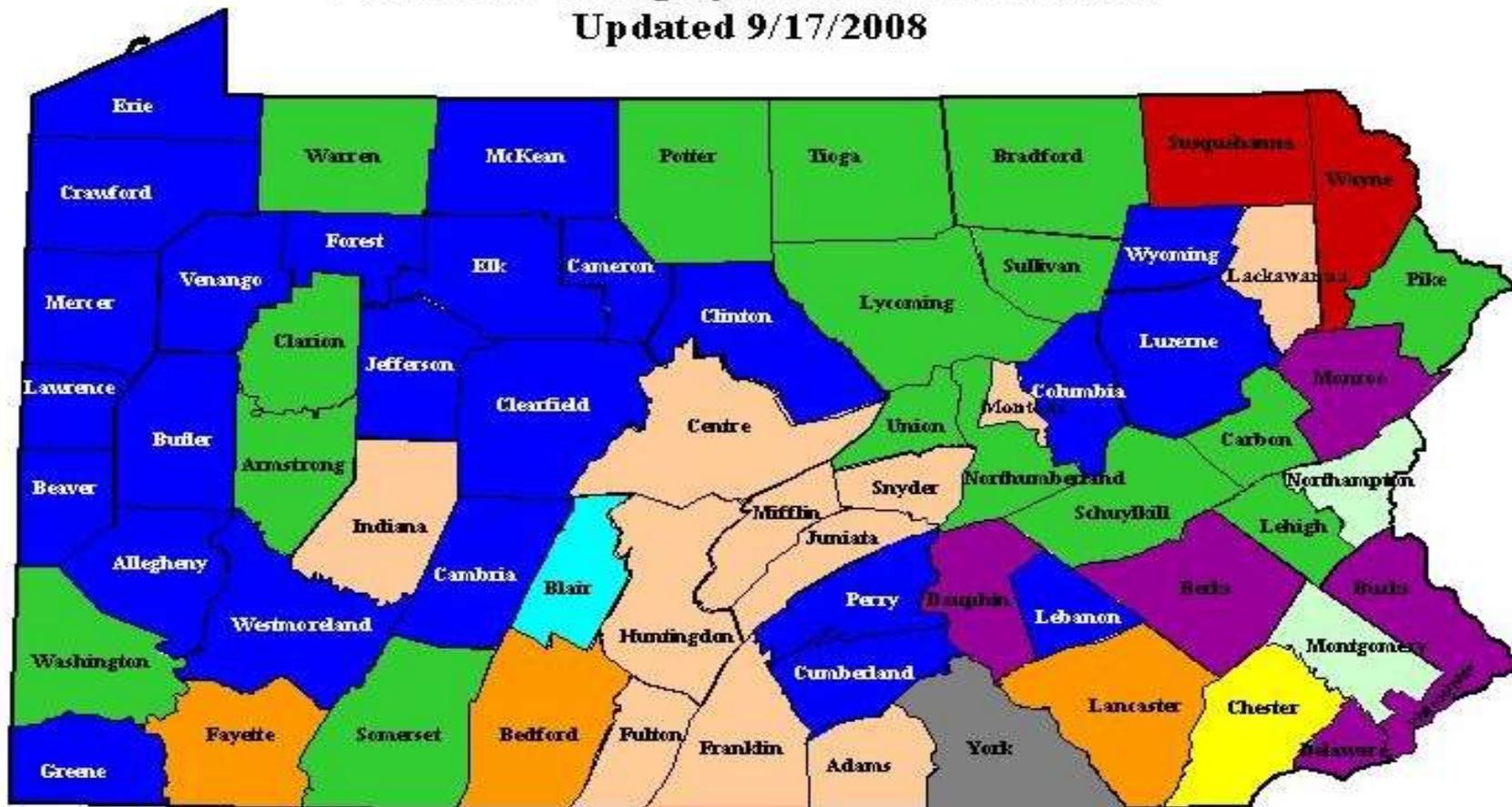
Defining L & A Testing

- Preparation of manual or automated testing patterns for direct recording electronic voting systems that will ensure the voting system units are accurately tabulating votes cast.

- Testing all tabulating equipment used in each precinct or centrally on Election Day using the memory card(s) specific to each location.

- Testing all ancillary functionality of the voting system, including audio ballots for the visually impaired.

Pennsylvania Election Law relating to L&A Testing

- As it relates to logic and accuracy testing, Pennsylvania Law includes three key provisions:

- Voting system preparation and testing that is open to political parties and any citizen organizations that are concerned with the conduct of elections. This provision provides generally for logic and accuracy testing, voting system preparation, and proper chain of custody for voting system elements.

- Directives and instructions issued by the Secretary of the Commonwealth concerning the implementation and operation of electronic voting systems.

- Central tabulating equipment testing that is open to the general public.

Electronic Voting Systems for PA Counties
Updated 9/17/2008

	Danaher ELECTronic 1242 (6)		ES&S M100/iVotronic (1)		Hart eScan/eSlate (3)		Sequoia Edge II (1)
	ES&S M650/AutoMark (2)		ES&S iVotronic (24)		Premier TSX (16)		
	ES&S M 100/AutoMark (11)		Hart eSlate (1)		Sequoia Advantage (2)		

Voting Systems Used by Pennsylvania Counties

- Danaher 1242 - 6,387 units
- ES&S Automark – 674 units
- ES&S iVotronic - 11,680 units
- ES&S M 100 – 853 units
- ES&S M 650 – 2 units
- Hart eScan – 421 units
- Hart eSlate – 730 units
- Premier TSX - 3,393 units
- Sequoia Advantage -1,360 units
- Sequoia Edge II – 622 units

Model Counties

- Allegheny County – DRE

- Lackawanna County – Optical Scan

Allegheny County

Fast Facts:

- 785,891 registered voters
- 1,319 precincts
- 4,227 iVotronic DREs
- 5 Model 650 high speed scanners
- 500 ballot configurations
- 40,000 ballots in the test deck

Allegheny County

Allegheny County

1. Automated L and A Testing is performed on each of the 4,227 DREs.

2. Manual L and A Testing was performed for each of the 500 ballot configurations for the DREs.

3. A test deck of 40,000 ballots was used to test each of the 5 M-650 scanners for absentee, provisional and emergency ballots.

4. Firmware verification is done on approximately 25 DREs selected at random by an independent third party.

5. Network security is evaluated by an independent third party.

6. Parallel testing is completed by a Certified Public Accounting firm to ensure functionality and tabulation.

Lackawanna County

Fast Facts:

- 150,006 registered voters
- 163 precincts
- 163 M-100s
- 124 Automarks

Lackawanna County

Lackawanna County

1. A test deck of 5,705 ballots was used to test each of the 163 M-100 scanners for absentee, provisional and emergency ballots.

2. Manual L and A Testing was performed for each precinct to test for exceptions not covered by the test deck such as:
    *   Wrong precinct
    *   Over Vote
    *   Vote every contest for every candidate
    *   Vote both straight party tickets
    *   Vote for the maximum number of write-ins
    *   Vote only referendum questions
    *   Vote straight party and then select a candidate of a different party on one contest
    *   Vote straight party Democrat and over vote referendum questions
    *   Vote straight party Republican and over vote referendum questions

3. Manual L and A Testing was performed to test each of the 124 Automarks.

Discussion Questions

1. Many jurisdictions are now required to advertise their logic and accuracy testing schedule in advance to accommodate the "legal organ" for the area. What other ways do you notify the public about these activities?

2. Logic and Accuracy testing typically focuses on vote capture and vote tabulation equipment. In addition to requiring these components, what else should be included in logic and accuracy testing? Should people be included in L&A testing?

3. How do engineering change orders (ECOs), recent changes in statute or rules, or lessons learned from other jurisdictions impact your logic and accuracy protocols? Maintaining congruence of your L&A test protocols with the current state of your voting system is challenging. How do you capture the evolution of your voting equipment in your logic and accuracy protocols?

4. How do the results of logic and accuracy testing inform your jurisdiction's certification process?

5. Vendors may be involved in the design and implementation of L&A tests. What is an appropriate role for vendors in this activity?

Other Questions??