State of Colorado
Department of State
1700 Broadway
Suite 200
Denver, Colorado 80290

January 2, 2013

Ref: SOS-HAVA-07-12-0001

Secretary of State S. Gessler,

Thank you for providing an opportunity to comment on the HAVA complaint submitted by Mr. A. Kolwicz. As a member of the 2012 Logic & Accuracy Test and the Boulder County Canvass Board, I had the opportunity to witness first-hand the mail ballot processing and interact with watchers that observed it intensively for extended periods.

I have read the proposed "Demonstration/Testing Bell and Howell Mail Ballot Sorter, Suggested Testing Plan" created by Mike Lyons and dated 12/14/12. While well intended, I feel the test plan is inadequate as it focuses on a piece of equipment rather than the election process for mail-ballots. It is the process, including the equipment, that was challenged by watchers from all parties and special interest groups. To focus only on the equipment is to grossly understate the concern and the scope of the problem.

In my opinion the problem the Secretary of State's office needs to address is whether or not the process used by the Boulder County Clerk, and others, is consistent and accurate in its determination of which Ballot Return Envelopes should be culled from further processing and which should continue through the scanning and vote counting process. The process should also account for all BREs submitted by the voter from the point of entry into the mail-ballot process, i.e., the point at which the voter relinquishes possession of his BRE, through the BRE resolution as separated from the ballot and submitted for scanning and counting or, rejected and culled for storage as inadmissible.

With regard to signature verification, a singular step in the processing of mail-ballots, it is important to understand that signature verification is not subject to a test for accuracy since every time we sign our signature, it is unique. There is no standard against which it can be compared. It is rather the outcome of the process that is important and its measure is consistent acceptance or rejection of the same signatures in multiple tests. Testing for this required consistentancy is completely missing from the test plan and is a major shortcoming.

I have copied the test plan below with my comments in **red**. These should not be taken as solutions but rather as examples of additional elements that I feel would provide for a more robust testing of the mail-ballot process.

Overview
The purpose of this test plan is to provide a framework for demonstrating the capabilities of the Bell and Howell inbound mail ballot envelope sorter in Boulder County. The demonstration should help define the scope of the product, what it can and cannot do, as well as how it interfaces to the Colorado Statewide Voter Registration Database.

This "demonstration" is inadequate since it does not test for consistent output of the mail ballot process. Instead, it focuses only on the Bell & Howell equipment.

Boulder County has already performed significant load tests, as well as acceptance testing and this plan should in no way reflect on those previous tests. Additionally, Boulder County has now used the Bell and Howell machine for both the 2012 Primary and 2012 General Elections.

This testing has never been the subject of the LAT and it should be.

Scope

The test should allow for the Secretary of State and his representatives to see mail ballot envelope sorter and associated hardware and software in use, and determine what it can and cannot do. Typically, mail ballot envelope sorters:

- Allow for a file import to configure the database for a specific election and voters
- Allow for configuration of different envelopes sizes and thicknesses
- Sort envelopes into pockets based in a pre-determined batch size
- Capture an image of each envelope
- Provide an interface for election workers to view and accept or reject voter signatures
- Create an export file (.txt) that can be imported into SCORE to create batches in the "Receive Absentee" module

While these statements are true, they are limited to the sorting equipment and do not include the process. I would suggest the following additions as examples, not an exhaustive list by any mean:

- **Provide check-sums to assure that all BREs entering the process are accounted for by acceptance or rejection**
- **Generate a log file of signature screens presented to specific verification teams**
- **Provide the time spent verifying the signatures on the screen**
- **Provide a signature image that is complete or cull the BRE for manual inspection**
  Watchers noted that large signatures were truncated by the B&H imaging
- **Provide a suitable signature image file compatible with signature verification software**
  This process begs for automation and is poorly designated to human interpretation.

Test Decks

Test decks of mail ballot envelopes will need to be created for testing purposes. The batches below would give a good sense of the types of things found in a typical election cycle. The ballot envelopes should at a minimum, should:

- Be part of an election in SCORE (sandbox or UAT)
- Have valid signatures to verify Signature Verification Client
- Be of the same type (size, color, etc.) used in a live election
- Contain a piece of ballot stock (does not need to be a live ballot) and a secrecy sleeve (unless otherwise noted below)

The test deck needs to include invalid signatures generated by forging valid signatures using the seven criteria outlined in SOS Rule 29.2. This provides the balance to the control group and represents the invalid signatures, which <u>must be rejected</u> in every test of the equipment and process.

- **Code 1 – An obvious change in the slant of the signature**
- **Code 2 – A printed signature on one document and a cursive signature on the other document**
- **Code 3 – Differences in the size or scale of the signature**
- **Code 4 – Differences in the individual characteristics of the signatures, such as how the "t's" are**
- **crossed, "I's" are dotted, loops are made on "Y's" or "J's"**
- **Code 5 – Differences in the voter's signature style, such as how the letters are connected at the**
- **top and bottom**
- **Code 6 – Ballots or envelopes from the same household have been switched**
- **Code 7 – 'Other,' including misspelled names & description of discrepancy**

To prevent the test being contaminated by familiarity with the test deck, multiple test decks must be generated with different forged invalid signatures.

Process

Basically, the test should demonstrate that the sorter does what is expected to do; no more and no less. As discussed, the main function of the sorter is to sort ballots into manageable batches, provide for signature verification and provide an upload to SCORE. With that in mind, verification should occur as follows:

- Manually count the envelopes before and after each pass, accounting for each envelope
- Compare manual counts to machine counts on reports from the sorter for each batch
- Assuming that the batch count is right, verify that the correct envelope ID is captured by comparing that to the voter information on the envelopes
- View signature verification process and verify that envelopes can be rejected/accepted
- Verify SCORE export file contains the correct voter IDs and/or tracking numbers for each batch
- After importing into SCORE, verify:
  - Batch counts match sorter batch counts
  - Correct voters are getting credit for voting

This is too limited. The test should demonstrate that the mail ballot process does what is expected. In order to check for consistent output results, the test must be repeated at least twice. The measure of consistency is the comparison of how many invalid BREs were consistently rejected in multiple tests and whether or not all BREs submitted were accounted for. This could be used as a measure of accuracy if you accept that if all valid signature BREs are accepted and all invalid signature BREs are rejected, the signature verification process is 100% accurate. And, if all BREs are accounted for, the process has tracked all entrants from beginning to end.

Conclusion

Again, the purpose of this demonstration is to provide increased awareness of the Bell and Howell inbound mail ballot envelope sorter in Boulder County, its functions, sustainability, maintainability and its intended role in Colorado's elections. With enhanced understanding of the system, the Secretary will be in a better position to make decisions as to whether or not incoming mail ballot envelope sorters should be considered for inclusion as a part of the voting system, and as such be subject to certification.

This is incorrect and too limiting. As pointed out above, the question concerns the mail ballot process including the Bell & Howell equipment, not just the equipment.

Thank you for the opportunity to provide input to your testing. As a professional Process Engineer for IBM Corp. for 32 years, I believe I have the credentials necessary to make valid criticisms of the proposed test plan and offer suggestions for its improvement. If I can be of help in its implementation, I will be happy to do so. Please feel free to call me at 303-776-5416 or via e-maill at rwboehm@comcast.net .

Respectfully,

RW Boehm